

ALABAMA

Name(s)	
Title(s)	Assistant State Maintenance Engineer - Bridge
Agency	Alabama Department of Transportation
State/Province	AL
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 50
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:

ALABAMA

What type of PT structures are in your inventory? Please check all that apply.	<input type="checkbox"/> Cast-in-place segmental <input type="checkbox"/> Cast-in-place segmental
	<input type="checkbox"/> Precast segmental <input type="checkbox"/> Precast segmental
	<input type="checkbox"/> Cast-in-place, non-segmental
	<input type="checkbox"/> PT decks <input type="checkbox"/> PT decks
	<input type="checkbox"/> PT slab bridges
	<input type="checkbox"/> Box girders <input type="checkbox"/> Box girders
	<input type="checkbox"/> Pier caps
	<input type="checkbox"/> Spliced girder
	<input type="checkbox"/> Other <input type="checkbox"/> consists of precast channel units built in the 1970's
Are your PT structures designed for a specific service life?	<input type="checkbox"/> NO
	<input type="checkbox"/> YES, What is the design service life (number of years)?
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	<input type="checkbox"/> NO
	<input type="checkbox"/> YES
	<input type="checkbox"/> YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	<input type="text"/> Open-Ended Response
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	<input type="checkbox"/> NO <input type="checkbox"/> NO
	<input type="checkbox"/> YES

ALABAMA

On what types of PT structures have you performed repairs? Please check all that apply.

Cast-in-place segmental

Precast segmental

Cast-in-place, non-segmental

PT decks

PT slab bridges

Box girders

Pier caps

Spliced girder

Other

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?

NO NO

YES, Please provide a link:

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?

NO NO

YES, Please provide a link:

Who performs repairs? Please check all that apply.

In-house staff

Contractor

Other. Please describe:

Has your agency encountered issues requiring repair during construction?

NO
YES, Please describe issue and performed repair:

Has your agency encountered issues requiring repair related to corrosion?

NO
YES, Please describe issue and performed repair:

ALABAMA

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO

YES, Please describe issue and performed repair:

Has your agency performed repair/replacement of decks on PT bridges?

NO

NO

YES, Please describe issue and performed repair:

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

NO

YES, Please provide a link or location where procedure can be accessed:

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Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

- | | |
|---|----------------|
| Visual methods | Visual methods |
| Magnetic methods (i.e., magnetic flux leakage) | |
| vibration methods (i.e., acoustic emission, impact echo, ultrasonic) | |
| Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar) | |
| Direct measurement of tendon force (i.e. gages on strands) | |
| Radiation methods (i.e., x-ray diffraction, radiography) | |
| Electrochemical techniques (i.e., half-cell potential) | |
| Other, or not sure how to classify. Please describe: | |

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.

- | |
|-----------------------------|
| ASBI grouting certification |
| PTI Level 1 installer |
| PTI Level 2 installer |
| Other, please describe: |

ALABAMA

Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.

Open-Ended Response

Does your agency have grout storage requirements?

NO

YES, Please specify guiding document, provide link, or describe:

Who conducts QA? Please check all that apply.

Contractor

In-house

Consultant inspection (CEI)

Other, please specify:

Who conducts QC? Please check all that apply.

Contractor

In-house

Consultant inspection (CEI)

Other, please specify:

Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.

Open-Ended Response

ALABAMA

Have you encountered problematic PT construction details?

YES

NO

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

ALABAMA

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

Have you found encountered issues with any of the materials used in PT construction?

YES

NO

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Elastomeric coatings

Epoxy grouts

Pour-back materials

Other, please specify:

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

How have you rectified these issues?

Open-Ended Response

ALABAMA

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

ALASKA

Name(s)	
Title(s)	Technical Engineer II
Agency	Alaska DOT&PF
State/Province	AK
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 10
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 3/1/2017
What were the reference documents used for updating? Please specify/explain:	ASBI, PTI, AASHTO, and other state DOT specifications (CA and FL) Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:

ALASKA

Are your PT specifications very similar to or derived from another state's?	NO	
	YES, Please specify source:	CA and FL
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	Box girders
	Pier caps	
	Spliced girder	
	Other	hybrid pre-tensioned, post-tensioned girders
	Are your PT structures designed for a specific service life?	NO NO
YES, What is the design service life (number of years)?		
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO NO	
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	Include as special provision: "Use pre-packaged thixotropic grout formulated specifically for bonded post-tensioned concrete structures in aggressive exposures."
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO NO	
	YES	

ALASKA

On what types of PT structures have you performed repairs? Please check all that apply.

Cast-in-place segmental

Precast segmental

Cast-in-place, non-segmental

PT decks

PT slab bridges

Box girders

Pier caps

Spliced girder

Other

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?

NO NO

YES, Please provide a link:

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?

NO NO

YES, Please provide a link:

Who performs repairs? Please check all that apply.

In-house staff

Contractor

Other. Please describe:

Has your agency encountered issues requiring repair during construction?

NO NO

YES, Please describe issue and performed repair:

Has your agency encountered issues requiring repair related to corrosion?

NO NO

YES, Please describe issue and performed repair:

ALASKA

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO NO

YES, Please describe issue and performed repair:

Has your agency performed repair/replacement of decks on PT bridges?

NO NO

YES, Please describe issue and performed repair:

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO NO

YES, Please provide a link or location where procedure can be accessed:

ALASKA

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	minimum of 5 years experience
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response	Refer to Section 502 of the Alaska Department of Transportation and Public Facilities Standard Specifications for Highway Construction. http://www.dot.state.ak.us/stwddes/csspecs/index.shtml
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe:	502-3.05.4. Grout Storage. Store all grout materials in a dry enclosure or building that is convenient to the work site. Limit on site storage of grout to a maximum period of one month.

ALASKA

Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	
	NO	NO

ALASKA

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

NO

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

ALASKA

Have you found encountered issues with any of the materials used in PT construction?	YES
	NO NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response We have very few CIP PT bridges in our inventory
How have you rectified these issues?	Open-Ended Response NA
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response NA

ARIZONA

Name(s)	
Title(s)	Bridge Design Manager
Agency	Arizona DOT
State/Province	AZ
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 500
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2008
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response Minor updates no reference
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: Caltrans

ARIZONA

What type of PT structures are in your inventory? Please check all that apply.	<input type="checkbox"/> Cast-in-place segmental <input type="checkbox"/> Cast-in-place segmental
	<input type="checkbox"/> Precast segmental
	<input type="checkbox"/> Cast-in-place, non-segmental
	<input type="checkbox"/> PT decks
	<input type="checkbox"/> PT slab bridges
	<input type="checkbox"/> Box girders <input type="checkbox"/> Box girders
	<input type="checkbox"/> Pier caps <input type="checkbox"/> Pier caps
	<input type="checkbox"/> Spliced girder <input type="checkbox"/> Spliced girder
	<input type="checkbox"/> Other
Are your PT structures designed for a specific service life?	<input type="checkbox"/> NO
	<input type="checkbox"/> YES, What is the design service life (number of years)? <input type="text" value="75"/>
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	<input type="checkbox"/> NO <input type="checkbox"/> NO
	<input type="checkbox"/> YES
	<input type="checkbox"/> YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	<input type="text" value="Open-Ended Response"/> <input type="text" value="cement/water"/>
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	<input type="checkbox"/> NO
	<input type="checkbox"/> YES <input type="checkbox"/> YES

ARIZONA

On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	Box girders
	Pier caps	
	Spliced girder	
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	of CIP concrete in webs around ducts. Failure of concrete at PT
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	

ARIZONA

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO

NO

YES, Please describe issue and performed repair:

Has your agency performed repair/replacement of decks on PT bridges?

NO

YES, Please describe issue and performed repair:

Repairs limited to deck patching and overlay of decks on PT bridges.

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

NO

YES, Please provide a link or location where procedure can be accessed:

ARIZONA

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.		
	Open-Ended Response	Construction Manual has procedures. Chapter 6 - Structures Link is https://azdot.gov/node/10355
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	

ARIZONA

Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	Contractor	
	In-house	
	Consultant inspection (CEI)	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Other, please specify:	
	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	YES
	NO	

ARIZONA

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

NO

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

ARIZONA

Have you found encountered issues with any of the materials used in PT construction?

YES

NO

NO

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Elastomeric coatings

Epoxy grouts

Pour-back materials

Other, please specify:

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

None

How have you rectified these issues?

Open-Ended Response

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

NA

CALIFORNIA	
Name(s)	
Title(s)	Senior Bridge Engineer
Agency	Caltrans, Transportation
State/Province	CA
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 2900
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 08/19/2019
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	AASHTO LRFD Bridge Design Specifications, Eighth Edition with California Amendments (AASHTO-CA BDS-8)
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:

CALIFORNIA

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	PT decks
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	
	Other	
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	75
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	cement/water or packaged complying with ASTM C1107
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES

CALIFORNIA

On what types of PT structures have you performed repairs? Please check all that apply.

Cast-in-place segmental

Precast segmental

Cast-in-place, non-segmental

Cast-in-place, non-segmental

PT decks

PT slab bridges

Box girders

Box girders

Pier caps

Spliced girder

Other

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?

NO

NO

YES, Please provide a link:

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?

NO

NO

YES, Please provide a link:

Who performs repairs? Please check all that apply.

In-house staff

Contractor

Contractor

Other. Please describe:

Has your agency encountered issues requiring repair during construction?

NO

YES, Please describe issue and performed repair:

PT duct popping of girder stem

Has your agency encountered issues requiring repair related to corrosion?

NO

YES, Please describe issue and performed repair:

Placed corrosion inhibitors in duct

CALIFORNIA

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO NO

YES, Please describe issue and performed repair:

Has your agency performed repair/replacement of decks on PT bridges?

NO NO

YES, Please describe issue and performed repair:

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor Injection of corrosion inhibitor

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO NO

YES, Please provide a link or location where procedure can be accessed:

CALIFORNIA

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	
	PTI Level 1 installer	
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Yes QC/QA Section 50 Standard Specificaitons Open-Ended Response	
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe: store grout in a dry environment	

CALIFORNIA

Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	Contractor	
	In-house	
	Consultant inspection (CEI)	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Other, please specify:	
	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	
	NO	NO

CALIFORNIA

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

NO

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

CALIFORNIA

Have you found encountered issues with any of the materials used in PT construction?

YES

NO

NO

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Elastomeric coatings

Epoxy grouts

Pour-back materials

Other, please specify:

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

Excessive prestress shrinkage causing joint and elastomeric bearing failure

How have you rectified these issues?

Open-Ended Response

Reconstruct joints openings and replace bearings

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

COLORADO	
Name(s)	
Title(s)	Professional Engineer II
Agency	Colorado Department of Transportation
State/Province	CO
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 173
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 12/13/2018
What were the reference documents used for updating? Please specify/explain:	PTI M50, PTI M, PTI Bonded Training course materials, ASBI training course materials. Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:

COLORADO

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	PT decks
	PT slab bridges	
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	
	Are your PT structures designed for a specific service life?	NO
YES, What is the design service life (number of years)?		
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	called out as PL-1B, but the specifications require all the
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	We require PTI M55 Classification: Class C Pre-packaged
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES

COLORADO

On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges
	Box girders Box girders
	Pier caps
	Spliced girder
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	Other
	NO NO
	YES, Please provide a link:
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO NO
	YES, Please provide a link:
Who performs repairs? Please check all that apply.	In-house staff
	Contractor Contractor
	Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO
	YES, Please describe issue and performed repair: Not sealed conduit, i.e. leaking.
Has your agency encountered issues requiring repair related to corrosion?	NO
	YES, Please describe issue and performed repair: Corroded strands discovered in external PT added after construction to control cracking. No repair performed, as no strength loss has occurred. PT strands are for serviceability on the structure

COLORADO

	NO	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	YES, Please describe issue and performed repair:	We have not done many repairs on P/T bridges except for the P/T slabs in Glenwood canyon during rockfall with FRP rebar strips. The asphalt was cracked and thought that the deck was also. After uncovering the overlay out the slab is fine. There was another instance in 2016 for repairing the same type of P/T slabs.
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	
	During construction	
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	
	Invasive inspection of PT system	
	Repair of pour-back (anchor block-out)	
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	
Does your agency have established inspection procedures specific to PT bridges?	NO	NO
	YES, Please provide a link or location where procedure can be accessed:	

COLORADO

<p>Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.</p>	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
<p>Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.</p>	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	See CDOT Standard Specification section 618.
<p>Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.</p>	Open-Ended Response	
<p>Does your agency have grout storage requirements?</p>	NO	NO
	YES, Please specify guiding document, provide link, or describe:	

COLORADO

Who conducts QA? Please check all that apply.	Contractor	Contractor
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	N/A
Have you encountered problematic PT construction details?	YES	YES
	NO	

COLORADO

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details	Anchorage pour-back details
Mid-tendon vents	
Inspection ports	Inspection ports
Duct placement	Duct placement
Duct splicing	Duct splicing
Heat-shrink sleeves	
Confinement reinforcement	Confinement reinforcement
Segment mating during erection	Segment mating during erection
Match-cast joints	Match-cast joints
Precast quality	
Deck drainage details	Deck drainage details
Other. Please describe:	

Have you encountered problematic construction techniques/methods?

YES	YES
NO	

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test	Air (pressure) test
Vacuum test	
Deck-level vent removal/permanent vent cap placement	
Permanent grout cap placement	
Grouting/filler procedures	
Vacuum grouting	
Preparing anchorage area for block-out pour	Preparing anchorage area for block-out pour
Other. Please specify.	

Have you found encountered issues with any of the materials used in PT construction?

YES	YES
NO	

COLORADO

Please identify materials which have been problematic. Please check all that apply.	Grout filler material	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	Pour-back materials
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	N/A
How have you rectified these issues?	Open-Ended Response	N/A
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	N/A

CONNECTICUT

Name(s)	
Title(s)	Trans. Principal Engineer
Agency	CTDOT
State/Province	CT
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 120
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

CONNECTICUT

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	PT decks
	PT slab bridges	
	Box girders	
	Pier caps	Pier caps
	Spliced girder	
	Other	
	Are your PT structures designed for a specific service life?	NO
YES, What is the design service life (number of years)?		
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	pre-bagged
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	NO
	YES	

CONNECTICUT

On what types of PT structures have you performed repairs? Please check all that apply.

Cast-in-place segmental

Precast segmental

Cast-in-place, non-segmental

PT decks

PT slab bridges

Box girders

Pier caps

Spliced girder

Other

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?

NO

NO

YES, Please provide a link:

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?

NO

NO

YES, Please provide a link:

Who performs repairs? Please check all that apply.

In-house staff

Contractor

Other. Please describe:

No repairs yet completed

Has your agency encountered issues requiring repair during construction?

NO

NO

YES, Please describe issue and performed repair:

Has your agency encountered issues requiring repair related to corrosion?

NO

NO

YES, Please describe issue and performed repair:

CONNECTICUT

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO NO
YES, Please describe issue and performed repair:

Has your agency performed repair/replacement of decks on PT bridges?

NO NO
YES, Please describe issue and performed repair:

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping FRP wrapping

Injection of corrosion inhibitor

Crack injection Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO
YES, Please provide a link or location where procedure can be accessed: YES

CONNECTICUT

<p>Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.</p>	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
<p>Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.</p>	ASBI grouting certification	
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	
<p>Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.</p>		
	Open-Ended Response	
<p>Does your agency have grout storage requirements?</p>	NO	NO
	YES, Please specify guiding document, provide link, or describe:	

CONNECTICUT

Who conducts QA? Please check all that apply.	Contractor
	In-house In-house
	Consultant inspection (CEI) Consultant inspection (CEI)
	Other, please specify:
Who conducts QC? Please check all that apply.	Contractor Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response
Have you encountered problematic PT construction details?	YES
	NO

CONNECTICUT

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

NO

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

CONNECTICUT

Have you found encountered issues with any of the materials used in PT construction?

YES

NO

NO

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Elastomeric coatings

Epoxy grouts

Pour-back materials

Other, please specify:

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

How have you rectified these issues?

Open-Ended Response

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

DELAWARE	
Name(s)	
Title(s)	Chief of Bridges & Structures
Agency	Delaware DOT
State/Province	DE
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 3
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 12/31/2017
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response PTI
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:

DELAWARE

What type of PT structures are in your inventory? Please check all that apply.	<input type="checkbox"/> Cast-in-place segmental <input type="checkbox"/> Cast-in-place segmental
	<input type="checkbox"/> Precast segmental <input type="checkbox"/> Precast segmental
	<input type="checkbox"/> Cast-in-place, non-segmental
	<input type="checkbox"/> PT decks
	<input type="checkbox"/> PT slab bridges
	<input type="checkbox"/> Box girders
	<input type="checkbox"/> Pier caps <input type="checkbox"/> Pier caps
	<input type="checkbox"/> Spliced girder <input type="checkbox"/> Spliced girder
	<input type="checkbox"/> Other
	Are your PT structures designed for a specific service life?
<input type="checkbox"/> YES, What is the design service life (number of years)? <input type="text" value="75"/>	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	<input type="checkbox"/> NO <input type="checkbox"/> NO
	<input type="checkbox"/> YES
	<input type="checkbox"/> YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	<input type="checkbox"/> Open-Ended Response <input type="checkbox"/> cement/water
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	<input type="checkbox"/> NO <input type="checkbox"/> NO
	<input type="checkbox"/> YES

DELAWARE

On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
	Other
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO no
	YES, Please provide a link: Our cable stay bridge has an owner's manual
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO NO
	YES, Please provide a link:
Who performs repairs? Please check all that apply.	In-house staff
	Contractor Contractor
	Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO NO
	YES, Please describe issue and performed repair:
Has your agency encountered issues requiring repair related to corrosion?	NO NO
	YES, Please describe issue and performed repair:

DELAWARE

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	<div>NO</div> <div>NO</div>
	YES, Please describe issue and performed repair:
Has your agency performed repair/replacement of decks on PT bridges?	<div>NO</div> <div>NO</div>
	YES, Please describe issue and performed repair:
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	<input type="checkbox"/> Member strengthening to address corrosion/impact damage
	<input type="checkbox"/> Re-grouting of tendons
	<input type="checkbox"/> During construction
	<input type="checkbox"/> At a later stage when structure in-service
	<input type="checkbox"/> NDT-aided inspection of PT system
	<input type="checkbox"/> Invasive inspection of PT system
	<input type="checkbox"/> Repair of pour-back (anchor block-out)
	<input type="checkbox"/> FRP wrapping
	<input type="checkbox"/> Injection of corrosion inhibitor
	<input type="checkbox"/> Crack injection
	<input type="checkbox"/> Crack injection
	<input type="checkbox"/> Repair or replacement of deck on a PT superstructure
	<input type="checkbox"/> Internal/bonded tendon replacement
	<input type="checkbox"/> External/unbonded tendon replacement
	<input type="checkbox"/> Other. Please specify:
Does your agency have established inspection procedures specific to PT bridges?	<div>NO</div> <div>NO</div>
	YES, Please provide a link or location where procedure can be accessed:

DELAWARE

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)
	Radiation methods (i.e., x-ray diffraction, radiography)
	Electrochemical techniques (i.e., half-cell potential)
	Other, or not sure how to classify. Please describe:
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	<div>ASBI grouting certification</div> <div>ASBI grouting certification</div>
	PTI Level 1 installer
	PTI Level 2 installer
	Other, please describe:
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<div>Open-Ended Response</div> <div>PTI Recommendations</div>
Does your agency have grout storage requirements?	NO
	YES, Please specify guiding document, provide link, or describe: Special provision in contract docs

DELAWARE

Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
Have you encountered problematic PT construction details?	YES	
	NO	NO

DELAWARE

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

NO

DELAWARE

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

Have you found encountered issues with any of the materials used in PT construction?

YES

NO

NO

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Elastomeric coatings

Epoxy grouts

Pour-back materials

Other, please specify:

DELAWARE

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	<div>Open-Ended Response</div> <div>None</div>
How have you rectified these issues?	<div>Open-Ended Response</div> <div>N/A</div>
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	<div>NO</div> <div>NO</div>
	<div>YES, Please describe how it was performed:</div>
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	<div>Open-Ended Response</div> <div>None</div>

FLORIDA

Name(s)	
Title(s)	Major Bridge Design Engineer
Agency	FDOT
State/Province	FL
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 500
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2020
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response FDOT Structure Design Guidelines, Spec. 462
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

FLORIDA

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	PT decks
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	PT column, PT U beam, PT straddle beam, PT C pier, footing
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	75
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	FDOT protection level is equal to or better than PL-2
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	Prepackaged and pre-approved grouts
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES

FLORIDA

On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	PT decks
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	Spliced girder
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	Other	Pier column
	NO	NO
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	YES, Please provide a link:	
	NO	NO
Who performs repairs? Please check all that apply.	YES, Please provide a link:	
	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	1.Repair of cracked PT anchor blocks, blisters 2.Repair of cracked box girder webs 3.Repair of cracked shear keys 4. Re-grouting voids in PT ducts
Has your agency encountered issues requiring repair related to corrosion?	NO	
	YES, Please describe issue and performed repair:	Since 1999, we have many projects repair related to tendon failure / corrosion. Sunshine Skyway Bridge: tendon corrosion due to lack of protection (bleed water); cracked PE duct Ringling Bridge: tendon failure and corrosion due to soft grout, replaced external tendons Wonderwood Bridge: tendon corrosion due to soft grout and voids, drying and impregnation of tendons, added external tendons. Nile channel Bridge: replaced external tendons Mid-Bay Bridge: replaced external tendons

FLORIDA

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO

NO

YES, Please describe issue and performed repair:

Has your agency performed repair/replacement of decks on PT bridges?

NO

NO

YES, Please describe issue and performed repair:

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

Re-grouting of tendons

During construction

During construction

At a later stage when structure in-service

At a later stage when structure in-service

NDT-aided inspection of PT system

NDT-aided inspection of PT system

Invasive inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

Repair of pour-back (anchor block-out)

FRP wrapping

FRP wrapping

Injection of corrosion inhibitor

Injection of corrosion inhibitor

Crack injection

Crack injection

Repair or replacement of deck on a PT superstructure

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Repair tendons due to the presence of soft grout. (Drying of tendons).

FLORIDA

Does your agency have established inspection procedures specific to PT bridges?

NO

NO

YES, Please provide a link or location where procedure can be accessed:

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods

Visual methods

Magnetic methods (i.e., magnetic flux leakage)

Magnetic methods (i.e., magnetic flux leakage)

Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)

Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)

Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)

Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)

Direct measurement of tendon force (i.e. gages on strands)

Radiation methods (i.e., x-ray diffraction, radiography)

Electrochemical techniques (i.e., half-cell potential)

Electrochemical techniques (i.e., half-cell potential)

Other, or not sure how to classify. Please describe:

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.

ASBI grouting certification

PTI Level 1 installer

PTI Level 2 installer

Other, please describe:

FDOT required CTQP Level 1 and 2

Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.

Open-Ended Response

CPAM

FLORIDA

Does your agency have grout storage requirements?	NO
	YES, Please specify guiding document, provide link, or describe: See FDOT Spec. 462
Who conducts QA? Please check all that apply.	Contractor
	In-house
	Consultant inspection (CEI) Consultant inspection (CEI)
	Other, please specify:
Who conducts QC? Please check all that apply.	Contractor Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response See FDOT Standard Detailing Manual
Have you encountered problematic PT construction details?	YES YES
	NO

FLORIDA

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details	Anchorage pour-back details
Mid-tendon vents	X
Inspection ports	
Duct placement	
Duct splicing	Duct splicing
Heat-shrink sleeves	Heat-shrink sleeves
Confinement reinforcement	
Segment mating during erection	
Match-cast joints	Match-cast joints
Precast quality	Precast quality
Deck drainage details	
Other. Please describe:	blisters / deviators. 2.Grout vent tubes sticking up on the deck, mostly

Have you encountered problematic construction techniques/methods?

YES	YES
NO	

FLORIDA

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test	Air (pressure) test
Vacuum test	
Deck-level vent removal/permanent vent cap placement	Deck-level vent removal/permanent vent cap placement
Permanent grout cap placement	
Grouting/filler procedures	Grouting/filler procedures
Vacuum grouting	
Preparing anchorage area for block-out pour	
Other. Please specify.	CIP joints, e.g. for PT spliced girder bridge.

Have you found encountered issues with any of the materials used in PT construction?

YES	YES
NO	

Please identify materials which have been problematic. Please check all that apply.

Grout filler material	Grout filler material
Flexible filler material (non-cementitious, wax, grease, etc.)	
Prestressing steel	
Elastomeric coatings	
Epoxy grouts	
Pour-back materials	Pour-back materials
Other, please specify:	

FLORIDA

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

Grout voids in draped tendons.

How have you rectified these issues?

Open-Ended Response

Re-grouting the tendons with vacuum grouting method.

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

Wonderwood Bridge Repair Issue: Repair of soft grout

GEORGIA

Name(s)	
Title(s)	State Bridge Engineer
Agency	Georgia DOT
State/Province	GA
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 150
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 11/06/2006
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response PTI Grout Specifications
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

GEORGIA

What type of PT structures are in your inventory? Please check all that apply.	<input type="checkbox"/> Cast-in-place segmental <input type="checkbox"/> Cast-in-place segmental
	<input type="checkbox"/> Precast segmental
	<input type="checkbox"/> Cast-in-place, non-segmental
	<input type="checkbox"/> PT decks
	<input type="checkbox"/> PT slab bridges
	<input type="checkbox"/> Box girders <input type="checkbox"/> Box girders
	<input type="checkbox"/> Pier caps <input type="checkbox"/> Pier caps
	<input type="checkbox"/> Spliced girder <input type="checkbox"/> Spliced girder
	<input type="checkbox"/> Other
	Are your PT structures designed for a specific service life?
<input type="checkbox"/> YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	<input type="checkbox"/> NO <input type="checkbox"/> NO
	<input type="checkbox"/> YES
	<input type="checkbox"/> YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	<input type="checkbox"/> Open-Ended Response <input type="checkbox"/> pre-bagged
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	<input type="checkbox"/> NO <input type="checkbox"/> NO
	<input type="checkbox"/> YES

GEORGIA

On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	Box girders
	Pier caps	
	Spliced girder	
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	segregation/honeycomb in some box girder walls. Repairs were made
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	

GEORGIA

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO

NO

YES, Please describe issue and performed repair:

Has your agency performed repair/replacement of decks on PT bridges?

NO

NO

YES, Please describe issue and performed repair:

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

YES, Please provide a link or location where procedure can be accessed:

GEORGIA

<p>Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.</p>	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
<p>Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.</p>	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	PTI Level 1 installer
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
<p>Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.</p>	Open-Ended Response	All of the above are required by contract special provisions.
<p>Does your agency have grout storage requirements?</p>	NO	
	YES, Please specify guiding document, provide link, or describe:	Project specifications require proper storage and shelf life

GEORGIA

Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	N/A
Have you encountered problematic PT construction details?	YES	YES
	NO	

GEORGIA

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct placement

Duct splicing

Heat-shrink sleeves

Heat-shrink sleeves

Confinement reinforcement

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

YES

NO

GEORGIA

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

X

Vacuum grouting

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

Have you found encountered issues with any of the materials used in PT construction?

YES

YES

NO

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Elastomeric coatings

Epoxy grouts

Pour-back materials

Pour-back materials

Other, please specify:

GEORGIA

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	Cracking in decks and leaking between segments
How have you rectified these issues?	Open-Ended Response	epoxy injection
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	N/A

HAWAII

Name(s)	
Title(s)	CE/SE
Agency	HDOT
State/Province	HI
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 20
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 12/31/2018
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response BrM & SI&A
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: CALTRANS

HAWAII

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	
	PT slab bridges	
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	
	Are your PT structures designed for a specific service life?	NO
YES, What is the design service life (number of years)?		50
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	"pre-bagged, proprietary", "cement/water"
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES

HAWAII

On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders Box girders
	Pier caps Pier caps
	Spliced girder Spliced girder
	Other
	Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?
YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO NO
	YES, Please provide a link:
Who performs repairs? Please check all that apply.	In-house staff
	Contractor Contractor
	Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO NO
	YES, Please describe issue and performed repair:
Has your agency encountered issues requiring repair related to corrosion?	NO NO
	YES, Please describe issue and performed repair:

HAWAII

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO

YES, Please describe issue and performed repair:

Oversize vehicle impact strikes:
Contracted out repairs per approved repair drawings:

Has your agency performed repair/replacement of decks on PT bridges?

NO

NO

YES, Please describe issue and performed repair:

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

Re-grouting of tendons

During construction

At a later stage when structure in-service

At a later stage when structure in-service

NDT-aided inspection of PT system

NDT-aided inspection of PT system

Invasive inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Crack injection

Repair or replacement of deck on a PT superstructure

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

YES, Please provide a link or location where procedure can be accessed:

HAWAII

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	PTI Level 1 installer
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.		
	Open-Ended Response	QA/QC provided by contractors, Reviewed by in house Engineers.
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	

HAWAII

Who conducts QA? Please check all that apply.	Contractor	Contractor
	In-house	
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	QA/QC Highly certified contractors, Engineering contractors
Have you encountered problematic PT construction details?	YES	
	NO	NO

HAWAII

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

NO

HAWAII

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

Have you found encountered issues with any of the materials used in PT construction?

YES

YES

NO

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Prestressing steel

Elastomeric coatings

Elastomeric coatings

Epoxy grouts

Epoxy grouts

Pour-back materials

Pour-back materials

Other, please specify:

HAWAII

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

Corrosion

How have you rectified these issues?

Open-Ended Response

Contracted with QA/QC

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

N/A

IDAHO	
Name(s)	
Title(s)	State Bridge Engineer
Agency	Idaho Transportation Dept
State/Province	ID
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 40
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2018
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response PTI Grouting Specification
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: Washington DOT

IDAHO

What type of PT structures are in your inventory? Please check all that apply.	<input type="checkbox"/> Cast-in-place segmental <input type="checkbox"/> Cast-in-place segmental
	<input type="checkbox"/> Precast segmental
	<input type="checkbox"/> Cast-in-place, non-segmental <input type="checkbox"/> Cast-in-place, non-segmental
	<input type="checkbox"/> PT decks <input type="checkbox"/> PT decks
	<input type="checkbox"/> PT slab bridges
	<input type="checkbox"/> Box girders
	<input type="checkbox"/> Pier caps <input type="checkbox"/> Pier caps
	<input type="checkbox"/> Spliced girder
	<input type="checkbox"/> Other
Are your PT structures designed for a specific service life?	<input type="checkbox"/> NO <input type="checkbox"/> NO
	<input type="checkbox"/> YES, What is the design service life (number of years)?
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	<input type="checkbox"/> NO <input type="checkbox"/> NO
	<input type="checkbox"/> YES
	<input type="checkbox"/> YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	<input type="checkbox"/> Open-Ended Response <input type="checkbox"/> commercial pre-packaged thixotropic tendon grout
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	<input type="checkbox"/> NO
	<input type="checkbox"/> YES <input type="checkbox"/> YES

IDAHO

On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	Pier caps
	Spliced girder	
	Other	Straddle Bent Pier Cap
	Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO
YES, Please provide a link:		
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	Voids or honeycombing underneath p-t anchorages or bearing plates
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	

IDAHO

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	
	YES, Please describe issue and performed repair:	We have hydro demolished 1-1/2" inches of concrete removal of the deck of a post tensioned box an applied a silica fume composite overlay.
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	
	During construction	During construction
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	
	Invasive inspection of PT system	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)	
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	Crack injection
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	
	Does your agency have established inspection procedures specific to PT bridges?	NO
YES, Please provide a link or location where procedure can be accessed:		

IDAHO

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
	Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification
PTI Level 1 installer		
PTI Level 2 installer		
Other, please describe:		
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.		
	Open-Ended Response	On site State Inspectors or CE&I consultant inspectors
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	

IDAHO

Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	
	NO	NO

IDAHO

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement X

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe: Rebar congestion

Have you encountered problematic construction techniques/methods?

YES YES

NO

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures X

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

IDAHO

Have you found encountered issues with any of the materials used in PT construction?	YES	
	NO	NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	Some concern with older style grout segregation and shrinkage. No problems found to date.
How have you rectified these issues?	Open-Ended Response	Yes
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	We have not had to replace a deteriorated hinge as yet, but would be interested received such information if found.

INDIANA

Name(s)	
Title(s)	Standards Engineer
Agency	Indiana Department of Transportation
State/Province	IN
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 24
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 11/06/2019
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response PTI, ASBI
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

INDIANA

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	PT decks
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	75
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	pre-bagged, thixotropic, in accordance with 10.9.3 of LRFD Bridge Construction Specifications
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	
	Spliced girder	Spliced girder
	Other	

INDIANA

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	
	YES, Please describe issue and performed repair:	Voids detected in ducts, some strand corrosion. Required vacuum grouting.
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	

INDIANA

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	Member strengthening to address corrosion/impact damage
	Re-grouting of tendons	Re-grouting of tendons
	During construction	
	At a later stage when structure in-service	At a later stage when structure in-service
	NDT-aided inspection of PT system	NDT-aided inspection of PT system
	Invasive inspection of PT system	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)	Repair of pour-back (anchor block-out)
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	Crack injection
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	
	Does your agency have established inspection procedures specific to PT bridges?	NO
YES, Please provide a link or location where procedure can be accessed: YES		
Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	Radiation methods (i.e., x-ray diffraction, radiography)
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	

INDIANA

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	PTI Level 1 installer
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<p>We currently cover post-tensioning requirements under project specific unique special provisions (USP). Our most current USP required ASBI certification, inspection hold points for duct placement and pressure testing, duct proving prior to strand installation, pre-grouting inspection, and inspection of grout. We also require friction tests and five field tests of the grout (chloride ion, pressure bleed, mud balance, strength, and fluidity).</p> <p>Open-Ended Response</p>	
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe: Waterproof location.	
Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	We have used both in-house and consultant inspection services, depending on the project and staff availability.

INDIANA

Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	sub-contract this work to a specialty Contractor.
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	We have very general guidance in chapter 406 of our Indiana Design Manual. https://www.in.gov/indot/design_manual/design_manual_2013.htm
Have you encountered problematic PT construction details?	YES	
	NO	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO

INDIANA

Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
Other, please specify:		
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	The issues that I'm aware of are related to poor grouting or poor grout materials, or inadequate design. These were discovered on older bridges that didn't use modern grout or modern design software.
How have you rectified these issues?	Open-Ended Response	Yes. We have vacuum grouted voids and also performed strengthening retrofits.
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	I70 WB Ramp over I70 on the east side of Indianapolis had some crack injection and a shear strengthening retrofit performed within the past three years.

IOWA	
Name(s)	
Title(s)	State Bridge Engineer
Agency	Department of Transportation
State/Province	IA
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO NO
	YES, please specify approximate quantity:
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability Concerns related to quality/durability
	Expense Expense
	Time consuming design/construction
	Other, Please describe: Lack of a locally established industry presence to build post-tensioned of bridges.
When were your PT Specifications last updated (approximately)?	Date
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:

IOWA

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
Other	
Are your PT structures designed for a specific service life?	NO
	YES, What is the design service life (number of years)?
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO
	YES
	YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO
	YES

IOWA

On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
	Other
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO
	YES, Please provide a link:
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO
	YES, Please provide a link:
Who performs repairs? Please check all that apply.	In-house staff
	Contractor
	Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO
	YES, Please describe issue and performed repair:
Has your agency encountered issues requiring repair related to corrosion?	NO
	YES, Please describe issue and performed repair:
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO
	YES, Please describe issue and performed repair:
Has your agency performed repair/replacement of decks on PT bridges?	NO
	YES, Please describe issue and performed repair:

IOWA

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

- Member strengthening to address corrosion/impact damage
- Re-grouting of tendons
- During construction
- At a later stage when structure in-service
- NDT-aided inspection of PT system
- Invasive inspection of PT system
- Repair of pour-back (anchor block-out)
- FRP wrapping
- Injection of corrosion inhibitor
- Crack injection
- Repair or replacement of deck on a PT superstructure
- Internal/bonded tendon replacement
- External/unbonded tendon replacement
- Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

- NO
- YES, Please provide a link or location where procedure can be accessed:

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

- Visual methods
- Magnetic methods (i.e., magnetic flux leakage)
- Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
- Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
- Direct measurement of tendon force (i.e. gages on strands)
- Radiation methods (i.e., x-ray diffraction, radiography)
- Electrochemical techniques (i.e., half-cell potential)
- Other, or not sure how to classify. Please describe:

IOWA

Have you encountered problematic PT construction details?

YES

NO

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

Have you found encountered issues with any of the materials used in PT construction?

YES

NO

IOWA

<p>Please identify materials which have been problematic. Please check all that apply.</p>	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:
<p>What specific problems with deterioration of CIP post-tensioned bridges have you encountered?</p>	<p>Open-Ended Response</p>
<p>How have you rectified these issues?</p>	<p>Open-Ended Response</p>
<p>Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?</p>	<p>NO</p>
	<p>YES, Please describe how it was performed:</p>
<p>If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):</p>	<p>Open-Ended Response</p>

KANSAS

Name(s)	
Title(s)	Bridge Design Engineer
Agency	Kansas DOT
State/Province	KS
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 21
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 06/12/2018
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

KANSAS

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	
	Spliced girder	
	Other	
Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:		
	Open-Ended Response	prequalified prebagged
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	
	Spliced girder	
	Other	

KANSAS

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	
	YES, Please describe issue and performed repair:	required repair of the anchorages of transverse tendons We a had major
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	

KANSAS

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

Re-grouting of tendons

During construction

At a later stage when structure in-service

At a later stage when structure in-service

NDT-aided inspection of PT system

NDT-aided inspection of PT system

Invasive inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

NO

YES, Please provide a link or location where procedure can be accessed:

KANSAS

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	Magnetic methods (i.e., magnetic flux leakage)
	vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	(i.e., infrared thermography, impulse radar, ground penetrating radar)	(i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response	http://www.ksdot.org/Assets/wwwksdotorg/bureaus/burConsMain/specprov/2015/PDF/15-07014.pdf
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	

KANSAS

Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	YES
	NO	
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	Anchorage pour-back details
	Mid-tendon vents	
	Inspection ports	
	Duct placement	Duct placement
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	Deck drainage details
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO

KANSAS

Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	Epoxy grouts
	Pour-back materials	
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	anchorage protection for transverse tendons on PT slab bridges
How have you rectified these issues?	Open-Ended Response	Better material, closer inspection
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	US-54 Central Business District Viaduct- Wichita, KS PT Box girder, voids in metal ducts

KENTUCKY

Name(s)	
Title(s)	Branch Managers
Agency	KY Transportation Cabinet
State/Province	KY
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 6
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response KY does not have any specific PT specifications currently. If it is not covered by AASHTO, we don't specify anything else. Anything else would have to be covered by special
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:

KENTUCKY	
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
	Other post tensioned stay cables with grout.
Are your PT structures designed for a specific service life?	NO
	YES, What is the design service life (number of years)? 999
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO NO
	YES
	YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO
	YES YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
	Other Post tensioned stay cables.

KENTUCKY

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	adjacent duct. He could not get strands placed for next sequence. We
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	

KENTUCKY

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage
Re-grouting of tendons
During construction
At a later stage when structure in-service
NDT-aided inspection of PT system NDT-aided inspection of PT system
Invasive inspection of PT system
Repair of pour-back (anchor block-out)
FRP wrapping
Injection of corrosion inhibitor
Crack injection
Repair or replacement of deck on a PT superstructure
Internal/bonded tendon replacement
External/unbonded tendon replacement
Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO	NO
YES, Please provide a link or location where procedure can be accessed:	

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods	Visual methods
Magnetic methods (i.e., magnetic flux leakage)	
Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
Direct measurement of tendon force (i.e. gages on strands)	
Radiation methods (i.e., x-ray diffraction, radiography)	
Electrochemical techniques (i.e., half-cell potential)	
Other, or not sure how to classify. Please describe:	

KENTUCKY

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.

ASBI grouting certification

PTI Level 1 installer

PTI Level 2 installer

Other, please describe:

Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.

Open-Ended Response

Does your agency have grout storage requirements?

NO NO

YES, Please specify guiding document, provide link, or describe:

Who conducts QA? Please check all that apply.

Contractor Contractor
In-house In-house
Consultant inspection (CEI) Consultant inspection (CEI)
Other, please specify:

Who conducts QC? Please check all that apply.

Contractor Contractor
In-house In-house
Consultant inspection (CEI) Consultant inspection (CEI)
Other, please specify:

Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.

Open-Ended Response

KENTUCKY

Have you encountered problematic PT construction details?	YES	YES
	NO	
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	YES
	NO	
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	Grouting/filler procedures
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	Epoxy grouts
	Pour-back materials	
	Other, please specify:	

KENTUCKY

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

How have you rectified these issues?

Open-Ended Response

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

LOUISIANA

Name(s)	
Title(s)	Assistant Bridge Design Administrator
Agency	Louisiana Dept. of Transportation and Development
State/Province	LA
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 10
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2014
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response LA DOTD does not have standard PT specifications. PT specifications are created on a project by project basis.
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: borrowed for the most recent PT project

LOUISIANA

What type of PT structures are in your inventory? Please check all that apply.	<input type="checkbox"/> Cast-in-place segmental <input type="checkbox"/> Cast-in-place segmental
	<input type="checkbox"/> Precast segmental <input type="checkbox"/> Precast segmental
	<input type="checkbox"/> Cast-in-place, non-segmental
	<input type="checkbox"/> PT decks
	<input type="checkbox"/> PT slab bridges
	<input type="checkbox"/> Box girders
	<input type="checkbox"/> Pier caps <input type="checkbox"/> Pier caps
	<input type="checkbox"/> Spliced girder <input type="checkbox"/> Spliced girder
	<input type="checkbox"/> Other <input type="checkbox"/> bridges utilizing transverse PT bars (mostly built in the 70s and 80s) that
Are your PT structures designed for a specific service life?	<input type="checkbox"/> NO <input type="checkbox"/> NO
	<input type="checkbox"/> YES, What is the design service life (number of years)?
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	<input type="checkbox"/> NO
	<input type="checkbox"/> YES
	<input type="checkbox"/> YES, What is the level specified? <input type="checkbox"/> PL-2
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	<input type="checkbox"/> Open-Ended Response <input type="checkbox"/> Pre-bagged grout meeting the requirements of PTI M55 Type C
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	<input type="checkbox"/> NO
	<input type="checkbox"/> YES <input type="checkbox"/> YES

LOUISIANA

On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
Other		
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	concrete voids / honeycombs - Concrete surrounding PT anchor
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	

LOUISIANA

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage	
Re-grouting of tendons	Re-grouting of tendons
During construction	During construction
At a later stage when structure in-service	
NDT-aided inspection of PT system	
Invasive inspection of PT system	
Repair of pour-back (anchor block-out)	Repair of pour-back (anchor block-out)
FRP wrapping	
Injection of corrosion inhibitor	Injection of corrosion inhibitor
Crack injection	Crack injection
Repair or replacement of deck on a PT superstructure	
Internal/bonded tendon replacement	
External/unbonded tendon replacement	External/unbonded tendon replacement
Other. Please specify:	

Does your agency have established inspection procedures specific to PT bridges?

NO	NO
YES, Please provide a link or location where procedure can be accessed:	

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods	Visual methods
Magnetic methods (i.e., magnetic flux leakage)	
Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
Direct measurement of tendon force (i.e. gages on strands)	
Radiation methods (i.e., x-ray diffraction, radiography)	
Electrochemical techniques (i.e., half-cell potential)	
Other, or not sure how to classify. Please describe:	

LOUISIANA

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification		ASBI grouting certification
	PTI Level 1 installer		PTI Level 1 installer
	PTI Level 2 installer		PTI Level 2 installer
	Other, please describe:		
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<div></div>		
Does your agency have grout storage requirements?	NO		
	YES, Please specify guiding document, provide link, or describe:	Project specific requirements based on ASBI / PTI documents	
Who conducts QA? Please check all that apply.	Contractor		
	In-house	In-house	
	Consultant inspection (CEI)	Consultant inspection (CEI)	
	Other, please specify:		

LOUISIANA

Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	N/A
Have you encountered problematic PT construction details?	YES	YES
	NO	
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	Confinement reinforcement
	Segment mating during erection	
	Match-cast joints	
	Precast quality	Precast quality
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	YES
	NO	
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	Air (pressure) test
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	Permanent grout cap placement
	Grouting/filler procedures	Grouting/filler procedures
	Vacuum grouting	Vacuum grouting
	Preparing anchorage area for block-out pour	Preparing anchorage area for block-out pour
	Other. Please specify.	

LOUISIANA

Have you found encountered issues with any of the materials used in PT construction?	YES
	NO NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response None to date
How have you rectified these issues?	Open-Ended Response N/A
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response N/A

MAINE	
Name(s)	
Title(s)	Fabrication Engineer
Agency	MaineDOT
State/Province	ME
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 50
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response PCI Design and Standard Details
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link: MNL-116
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

MAINE

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	
	Spliced girder	
	Other	
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	75
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	ready mix grout with a compressive strength of 6ksi
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	
	YES, Please provide a link:	

MAINE

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?

NO

YES, Please provide a link:

Who performs repairs? Please check all that apply.

In-house staff

Contractor

Other. Please describe:

Has your agency encountered issues requiring repair during construction?

NO

YES, Please describe issue and performed repair:

Has your agency encountered issues requiring repair related to corrosion?

NO

YES, Please describe issue and performed repair:

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO

YES, Please describe issue and performed repair:

Has your agency performed repair/replacement of decks on PT bridges?

NO

YES, Please describe issue and performed repair:

MAINE

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

YES, Please provide a link or location where procedure can be accessed:

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods

Magnetic methods (i.e., magnetic flux leakage)

Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)

Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)

Direct measurement of tendon force (i.e. gages on strands)

Radiation methods (i.e., x-ray diffraction, radiography)

Electrochemical techniques (i.e., half-cell potential)

Other, or not sure how to classify. Please describe:

MAINE

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.

ASBI grouting certification

PTI Level 1 installer

PTI Level 2 installer

Other, please describe:

Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.

Open-Ended Response

Does your agency have grout storage requirements?

NO

YES, Please specify guiding document, provide link, or describe:

Who conducts QA? Please check all that apply.

Contractor

In-house

Consultant inspection (CEI)

Other, please specify:

Who conducts QC? Please check all that apply.

Contractor

In-house

Consultant inspection (CEI)

Other, please specify:

Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.

Open-Ended Response

MAINE

Have you encountered problematic PT construction details?

YES

NO

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

Have you found encountered issues with any of the materials used in PT construction?

YES

NO

MAINE

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Elastomeric coatings

Epoxy grouts

Pour-back materials

Other, please specify:

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

How have you rectified these issues?

Open-Ended Response

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

MARYLAND	
Name(s)	
Title(s)	Division Chief
Agency	Maryland State Highway Administration
State/Province	MD
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	NO
	YES, please specify approximate quantity:
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	
	Date
What were the reference documents used for updating? Please specify/explain:	
	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:

MARYLAND

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
	Other
Are your PT structures designed for a specific service life?	NO
	YES, What is the design service life (number of years)?
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO
	YES
	YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO
	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
Other	

MARYLAND

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?

NO

YES, Please provide a link:

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?

NO

YES, Please provide a link:

Who performs repairs? Please check all that apply.

In-house staff

Contractor

Other. Please describe:

Has your agency encountered issues requiring repair during construction?

NO

YES, Please describe issue and performed repair:

Has your agency encountered issues requiring repair related to corrosion?

NO

YES, Please describe issue and performed repair:

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO

YES, Please describe issue and performed repair:

Has your agency performed repair/replacement of decks on PT bridges?

NO

YES, Please describe issue and performed repair:

MARYLAND

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

YES, Please provide a link or location where procedure can be accessed:

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods

Magnetic methods (i.e., magnetic flux leakage)

Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)

Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)

Direct measurement of tendon force (i.e. gages on strands)

Radiation methods (i.e., x-ray diffraction, radiography)

Electrochemical techniques (i.e., half-cell potential)

Other, or not sure how to classify. Please describe:

MARYLAND

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification
	PTI Level 1 installer
	PTI Level 2 installer
	Other, please describe:
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response
Does your agency have grout storage requirements?	NO
	YES, Please specify guiding document, provide link, or describe:
Who conducts QA? Please check all that apply.	Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
Who conducts QC? Please check all that apply.	Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response
Have you encountered problematic PT construction details?	YES
	NO

MARYLAND

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details
	Mid-tendon vents
	Inspection ports
	Duct placement
	Duct splicing
	Heat-shrink sleeves
	Confinement reinforcement
	Segment mating during erection
	Match-cast joints
	Precast quality
	Deck drainage details
	Other. Please describe:
Have you encountered problematic construction techniques/methods?	YES
	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test
	Vacuum test
	Deck-level vent removal/permanent vent cap placement
	Permanent grout cap placement
	Grouting/filler procedures
	Vacuum grouting
	Preparing anchorage area for block-out pour
	Other. Please specify.
Have you found encountered issues with any of the materials used in PT construction?	YES
	NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:

MARYLAND

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

How have you rectified these issues?

Open-Ended Response

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

MASSACHUSETTS

Name(s)	
Title(s)	State Bridge Engineer
Agency	MassDOT
State/Province	MA
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 62
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 10/10/2004
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response Boston Central Artery Specification
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

MASSACHUSETTS

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	PT decks
	PT slab bridges	PT slab bridges
	Box girders	
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	
Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:		
	Open-Ended Response	pre-bagged
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	NO
	YES	
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	

MASSACHUSETTS

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	
	Other. Please describe:	Not Applicable
Has your agency encountered issues requiring repair during construction?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	

MASSACHUSETTS

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage
Re-grouting of tendons
During construction
At a later stage when structure in-service
NDT-aided inspection of PT system NDT-aided inspection of PT system
Invasive inspection of PT system
Repair of pour-back (anchor block-out)
FRP wrapping
Injection of corrosion inhibitor
Crack injection
Repair or replacement of deck on a PT superstructure
Internal/bonded tendon replacement
External/unbonded tendon replacement
Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO	NO
YES, Please provide a link or location where procedure can be accessed:	

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods	Visual methods
Magnetic methods (i.e., magnetic flux leakage)	
Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
Direct measurement of tendon force (i.e. gages on strands)	
Radiation methods (i.e., x-ray diffraction, radiography)	Radiation methods (i.e., x-ray diffraction, radiography)
Electrochemical techniques (i.e., half-cell potential)	
Other, or not sure how to classify. Please describe:	

MASSACHUSETTS

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response	
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	
Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	Not Applicable
Have you encountered problematic PT construction details?	YES	YES
	NO	

MASSACHUSETTS

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	Duct splicing
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	
	NO	NO

MASSACHUSETTS

Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?		
How have you rectified these issues?	Open-Ended Response	None
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	Open-Ended Response	N/A
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):		
	Open-Ended Response	N/A

MICHIGAN

Name(s)	
Title(s)	Chief Bridge Engineer
Agency	Michigan Department of Transportation
State/Province	MI
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 6
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 12/01/2013
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response ASBI, PTI, AASHTO, fib
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

MICHIGAN

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	PT slab bridges
	Box girders	
	Pier caps	Pier caps
	Spliced girder	
	Other	
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	50
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	PL-3
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	pre-bagged, thixotropic
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	

MICHIGAN

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	

MICHIGAN

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage	
Re-grouting of tendons	
During construction	
At a later stage when structure in-service	At a later stage when structure in-service
NDT-aided inspection of PT system	NDT-aided inspection of PT system
Invasive inspection of PT system	Invasive inspection of PT system
Repair of pour-back (anchor block-out)	
FRP wrapping	
Injection of corrosion inhibitor	
Crack injection	Crack injection
Repair or replacement of deck on a PT superstructure	
Internal/bonded tendon replacement	
External/unbonded tendon replacement	
Other. Please specify:	additional external tendon installation (reason not given).

Does your agency have established inspection procedures specific to PT bridges?

NO	NO
YES, Please provide a link or location where procedure can be accessed:	

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods	Visual methods
Magnetic methods (i.e., magnetic flux leakage)	
Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
Direct measurement of tendon force (i.e. gages on strands)	
Radiation methods (i.e., x-ray diffraction, radiography)	
Electrochemical techniques (i.e., half-cell potential)	
Other, or not sure how to classify. Please describe:	

MICHIGAN

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.		
	Open-Ended Response	mock-up construction, grout QA/QC
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe: ASBI, PTI	
Who conducts QA? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	

MICHIGAN

Have you encountered problematic PT construction details?	YES	YES
	NO	
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	Precast quality
	Deck drainage details	
	Other. Please describe:	Large shear keys cracking during erection.
Have you encountered problematic construction techniques/methods?	YES	YES
	NO	
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	Grouting/filler procedures
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	
	NO	NO

MICHIGAN

Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	principle web tension cracks, requiring injection and/or segment strengthening.
How have you rectified these issues?	Open-Ended Response	Capital projects to strengthen.
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	Zilwaukee bridge, Saginaw, MI - bearing replacement US-131 over Muskegon River - addition of external tendons for strengthening.

MINNESOTA	
Name(s)	
Title(s)	Metro District Structures Engineer
Agency	MnDOT
State/Province	MN
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 40
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2015
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response ASBI/PTI M50 and PTI M55
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	We have updated for each segmental project with input from the consultant designer. We have incorporated much of ASBI/PTI M50 and PTI M55 but have not switched completely to those specifications. We plan to do so in the future.
	Other, please provide a link:

MINNESOTA

Are your PT specifications very similar to or derived from another state's?	NO YES, Please specify source: Similar to FDOT with modifications for ASBI/PTI M50, PTI M55, and best practices suggested from consultant designers.	
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	PT decks
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)? 100	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	PL-2 except we have not successfully used duct couplers on precast segmental.
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response pre-bagged thixotropic grout	
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	

MINNESOTA

<p>Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?</p>	<p>NO</p> <p>no</p> <p>No standard plans but there are project-specific details for tendon replacement on the Plymouth Ave bridge over the Mississippi River in Minneapolis. This structures is owned by the city of Minneapolis. We also replaced external tendons that formed the tension-tie on a steel arch bridge.</p> <p>YES, Please provide a link:</p>
<p>Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?</p>	<p>NO</p> <p>Yes, we have a standard procedure for remedial grouting. See the following research projects: Considerations for Development of Inspection and Remedial Grouting Contracts for Post-tensioned Bridges - WJE/VSL: http://www.dot.state.mn.us/research/reports/2017/201704.pdf Development of Best Practices for Inspection of PT Bridges in Minnesota – Andrea Schokker, UMD: http://www.dot.state.mn.us/research/TS/2012/2012-09.pdf We have also performed invasive inspection of tendons in response to the Sika grout chloride issue.</p> <p>YES, Please provide a link:</p>
<p>Who performs repairs? Please check all that apply.</p>	<p>In-house staff</p> <p>Contractor</p> <p>Contractor</p> <p>Other. Please describe:</p>

MINNESOTA

Has your agency encountered issues requiring repair during construction?

NO

We have performed vacuum grouting repairs of partially grouted tendons during construction. We have many challenges with PT construction due to cold weather in MN. Segmental construction continues through the winter with strand placed in duct but not grouted due to low temperatures. Corrosion inhibitor is used as mitigation in the winter to protect ungrouted tendons. We have had to replace some tendons prior to grouting in the spring due to initial corrosion from water infiltration. We have also had PT anchorage blockouts (precast segments) that were not filled after grouting during the construction season. Water infiltrated the blockouts, froze, and spalled concrete around the anchorage blockout. The damaged areas were inspected with NDT methods (impact echo) and found no damage to concrete in front of the anchorage. Spalled areas were repaired with epoxy pourback material.

YES, Please describe issue and performed repair:

Has your agency encountered issues requiring repair related to corrosion?

NO

The city of Minneapolis replaced continuity tendons on the Plymouth Ave bridge over the Mississippi River in Minneapolis. This bridge is a CIP concrete box girder constructed with a mix of segmental and falsework methods. Deck drains routed inside the box girders leaked and saturated the bottom slab with chlorides.

YES, Please describe issue and performed repair:

Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?

NO

NO

YES, Please describe issue and performed repair:

MINNESOTA

Has your agency performed repair/replacement of decks on PT bridges?

NO

NO

YES, Please describe issue and performed repair:

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

Re-grouting of tendons

During construction

During construction

At a later stage when structure in-service

At a later stage when structure in-service

NDT-aided inspection of PT system

NDT-aided inspection of PT system

Invasive inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

Internal/bonded tendon replacement

External/unbonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

YES, Please provide a link or location where procedure can be accessed:

YES

MINNESOTA		
Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	PTI Level 1 installer
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Stressing ram calibration, stressing elongation check prior to cutting strands, air pressure test prior to grouting, visual grout vent inspection after grouting, drilling of a percentage of vent inspection ports, ASBI and PTI L1 & 2 certifications, grout tests – mud balance, flow cone, Schupack bleed test, and grout cubes.	
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe: See attached specs.	

MINNESOTA

Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	consultants hired to supplement the team.
Who conducts QC? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	tendon grouting mock-up prior to field installation
Have you encountered problematic PT construction details?	YES	YES
	NO	

MINNESOTA

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Confinement reinforcement

Segment mating during erection

Segment mating during erection

Match-cast joints

Precast quality

Precast quality

Deck drainage details

Deck drainage details

Deck drainage details in the past have caused deterioration. We try not to route deck drainage pipe to interior of box girder unless absolutely necessary and provide a secondary containment system if inside box. Sealing openings in the top slab for construction access. CIP closure pours on segmental bridges develop cracks. We have tried to mitigate by modifying stressing sequence to get early transverse compression during curing but the top slab still cracks. Maybe not a true construction detail, but need good shop drawings that identify conflicts before construction. Consider 3D shop drawings for complicated/congested areas of with high density of rebar and PT. Also, curved (both longitudinal curvature and curved web forms) cast-in-place box girder on falsework, difficult to layout web tendon ducts to tolerance as it is hard to define reference points. 3D shop drawings and additional field surveys may help with that.

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

YES

NO

MINNESOTA

Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	Air (pressure) test
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	X
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	X
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	Epoxy grouts
	Pour-back materials	Pour-back materials
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	Deck drainage issue mentioned above on the Plymouth Ave bridge.
How have you rectified these issues?	Open-Ended Response	Try not to route deck drainage through box girders and provide secondary containment if drains inside the box cannot be avoided.
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	
	YES, Please describe how it was performed:	No, but we have begun using stainless steel rebar in PT decks for that reason.
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	Plymouth Ave Bridge over Mississippi River in Minneapolis – Bridge No. 27611 – replaced continuity tendons due to leaking drainage system.

MISSISSIPPI	
Name(s)	
Title(s)	Director of Structures
Agency	Mississippi DOT
State/Province	MS
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 7
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 10/24/2019
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges
	Box girders
	Pier caps Pier caps
	Spliced girder Spliced girder
Other	

MISSISSIPPI

Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	PL-2
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response just that it meet PTI M55.1	
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	NO
	YES	
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	

MISSISSIPPI	
Who performs repairs? Please check all that apply.	In-house staff
	Contractor Contractor
	Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO NO
	YES, Please describe issue and performed repair:
Has your agency encountered issues requiring repair related to corrosion?	NO NO
	YES, Please describe issue and performed repair:
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO NO
	YES, Please describe issue and performed repair:
Has your agency performed repair/replacement of decks on PT bridges?	NO NO
	YES, Please describe issue and performed repair:
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage
	Re-grouting of tendons
	During construction
	At a later stage when structure in-service
	NDT-aided inspection of PT system
	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)
	FRP wrapping
	Injection of corrosion inhibitor
	Crack injection
	Repair or replacement of deck on a PT superstructure
	Internal/bonded tendon replacement
	External/unbonded tendon replacement
	Other. Please specify:
	Does your agency have established inspection procedures specific to PT bridges?
YES, Please provide a link or location where procedure can be accessed:	

MISSISSIPPI

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	
	PTI Level 1 installer	
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response	ASBI inspectors required, Agency will hire a 3rd party inspector to provide QA
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	

MISSISSIPPI

Who conducts QA? Please check all that apply.	Contractor
	In-house
	Consultant inspection (CEI) Consultant inspection (CEI)
	Other, please specify:
Who conducts QC? Please check all that apply.	Contractor Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response
Have you encountered problematic PT construction details?	YES
	NO NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details
	Mid-tendon vents
	Inspection ports
	Duct placement
	Duct splicing
	Heat-shrink sleeves
	Confinement reinforcement
	Segment mating during erection
	Match-cast joints
	Precast quality
	Deck drainage details
Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES
	NO NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test
	Vacuum test
	Deck-level vent removal/permanent vent cap placement
	Permanent grout cap placement
	Grouting/filler procedures
	Vacuum grouting
	Preparing anchorage area for block-out pour
	Other. Please specify.

MISSISSIPPI

Have you found encountered issues with any of the materials used in PT construction?	YES
	NO NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response
How have you rectified these issues?	Open-Ended Response
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response

MISSOURI	
Name(s)	
Title(s)	State Bridge Engineer
Agency	Missouri DOT
State/Province	MO
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 5
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response Unknown.
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link: Unknown
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder Spliced girder
	Other

MISSOURI

Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	Unknown. It's been 20 years since we built one.
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	NO
	YES	
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	PT decks
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	

MISSOURI

Has your agency encountered issues requiring repair during construction?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	
	YES, Please describe issue and performed repair:	We removed a 5" thick post tensioned concrete deck overlay and replaced it with a non-post tensioned concrete overlay.
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	
	During construction	
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	
	Invasive inspection of PT system	
	Repair of pour-back (anchor block-out)	
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
External/unbonded tendon replacement		
Other. Please specify:		
Does your agency have established inspection procedures specific to PT bridges?	NO	NO
	YES, Please provide a link or location where procedure can be accessed:	

MISSOURI

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.		
	Open-Ended Response	Unknown. It's been over 20 years since we built one.
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	
Who conducts QA? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	

MISSOURI

Who conducts QC? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	Unknown. It's been over 20 years since we've built one.
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	
	NO	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
Have you encountered problematic construction techniques/methods?	Other. Please describe:	
	YES	
Please identify construction methods that are problematic. Please check all that apply.	NO	NO
	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	

MISSOURI

Have you found encountered issues with any of the materials used in PT construction?

YES

NO

NO

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Elastomeric coatings

Epoxy grouts

Pour-back materials

Other, please specify:

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

How have you rectified these issues?

Open-Ended Response

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

MONTANA

Name(s)	
Title(s)	Bridge Engineer
Agency	Montana Dept of Transportation
State/Province	MT
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 5
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2016
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response Do not have standard specifications, only project specific provisions.
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges
	Box girders
	Pier caps Pier caps
	Spliced girder
	Other

MONTANA

Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response pre-bagged	
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	NO
	YES	
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	

MONTANA

Who performs repairs? Please check all that apply.	In-house staff
	Contractor Contractor
	Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO NO
	YES, Please describe issue and performed repair:
Has your agency encountered issues requiring repair related to corrosion?	NO NO
	YES, Please describe issue and performed repair:
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO NO
	YES, Please describe issue and performed repair:
Has your agency performed repair/replacement of decks on PT bridges?	NO NO
	YES, Please describe issue and performed repair:
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage
	Re-grouting of tendons
	During construction
	At a later stage when structure in-service
	NDT-aided inspection of PT system
	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)
	FRP wrapping
	Injection of corrosion inhibitor
	Crack injection
	Repair or replacement of deck on a PT superstructure
	Internal/bonded tendon replacement
	External/unbonded tendon replacement
	Other. Please specify:

MONTANA

Does your agency have established inspection procedures specific to PT bridges?

NO

NO

YES, Please provide a link or location where procedure can be accessed:

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods

Visual methods

Magnetic methods (i.e., magnetic flux leakage)

Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)

Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)

Direct measurement of tendon force (i.e. gages on strands)

Radiation methods (i.e., x-ray diffraction, radiography)

Electrochemical techniques (i.e., half-cell potential)

Other, or not sure how to classify. Please describe:

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.

ASBI grouting certification

PTI Level 1 installer

PTI Level 2 installer

Other, please describe:

Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.

Open-Ended Response

MONTANA

Does your agency have grout storage requirements?	NO YES, Please specify guiding document, provide link, or describe:
Who conducts QA? Please check all that apply.	Contractor In-house Consultant inspection (CEI) Other, please specify:
Who conducts QC? Please check all that apply.	Contractor In-house Consultant inspection (CEI) Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response
Have you encountered problematic PT construction details?	YES NO NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details Mid-tendon vents Inspection ports Duct placement Duct splicing Heat-shrink sleeves Confinement reinforcement Segment mating during erection Match-cast joints Precast quality Deck drainage details Other. Please describe:
Have you encountered problematic construction techniques/methods?	YES NO NO

MONTANA

Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test
	Vacuum test
	Deck-level vent removal/permanent vent cap placement
	Permanent grout cap placement
	Grouting/filler procedures
	Vacuum grouting
	Preparing anchorage area for block-out pour
	Other. Please specify.
Have you found encountered issues with any of the materials used in PT construction?	YES
	NO NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response
How have you rectified these issues?	Open-Ended Response
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response

NEBRASKA

Name(s)	
Title(s)	Assistant State Bridge Engineer
Agency	DOT
State/Province	NE
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 10
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 07/28/2017
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response LRFD SPEC,ASBI,PTI,fib,
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

NEBRASKA

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	PT slab bridges
	Box girders	
	Pier caps	
	Spliced girder	Spliced girder
	Other	
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	75
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	PL-1a and 1b
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response pre-bagged	
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO NO	
	YES	
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO NO	
	YES, Please provide a link:	

NEBRASKA

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	
	During construction	
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	NDT-aided inspection of PT system
	Invasive inspection of PT system	
	Repair of pour-back (anchor block-out)	
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	Crack injection
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	

NEBRASKA

Does your agency have established inspection procedures specific to PT bridges?	<div>NO</div> <div>NO</div>	
	YES, Please provide a link or location where procedure can be accessed:	
Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	Magnetic methods (i.e., magnetic flux leakage)
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	PTI Level 1 installer
	PTI Level 2 installer	
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<div>Open-Ended Response</div> <div>NOT done</div>	
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe: see Manual BOPP on line	
Who conducts QA? Please check all that apply.	Contractor	Contractor
	In-house	
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	

NEBRASKA

Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	not in position to provide best practice.
Have you encountered problematic PT construction details?	YES	
	NO	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	

NEBRASKA

Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
Other, please specify:		
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	camber
How have you rectified these issues?	Open-Ended Response	overlay
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	

NORTH DAKOTA

Name(s)	
Title(s)	State Bridge Engineer
Agency	Nevada DOT
State/Province	NV
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 430
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: Caltrans
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges PT slab bridges
	Box girders Box girders
	Pier caps Pier caps
	Spliced girder Spliced girder
	Other

NORTH DAKOTA

Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response pre-bagged	
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	
	Spliced girder	
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	

NORTH DAKOTA

Has your agency encountered issues requiring repair during construction?	NO NO	
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	
	YES, Please describe issue and performed repair:	Deck spalling. repairs have included isolated repairs and deck overlays.
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	
	During construction	
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	
	Invasive inspection of PT system	
	Repair of pour-back (anchor block-out)	Repair of pour-back (anchor block-out)
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	Crack injection
	Repair or replacement of deck on a PT superstructure	Repair or replacement of deck on a PT superstructure
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	
	Does your agency have established inspection procedures specific to PT bridges?	NO NO
YES, Please provide a link or location where procedure can be accessed:		

NORTH DAKOTA

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<div>Open-Ended Response</div> <div>Inspection of grouting and PT operations</div>	
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe:	
Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	

NORTH DAKOTA

Who conducts QC? Please check all that apply.	Contractor Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response
Have you encountered problematic PT construction details?	YES
	NO NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details
	Mid-tendon vents
	Inspection ports
	Duct placement
	Duct splicing
	Heat-shrink sleeves
	Confinement reinforcement
	Segment mating during erection
	Match-cast joints
	Precast quality
Have you encountered problematic construction techniques/methods?	YES
	NO NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test
	Vacuum test
	Deck-level vent removal/permanent vent cap placement
	Permanent grout cap placement
	Grouting/filler procedures
	Vacuum grouting
	Preparing anchorage area for block-out pour
	Other. Please specify.

NORTH DAKOTA

Have you found encountered issues with any of the materials used in PT construction?	YES
	NO NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response none
How have you rectified these issues?	Open-Ended Response
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response

NEW HAMPSHIRE

Name(s)	
Title(s)	Senior Project Engineer
Agency	NHDOT
State/Province	NH
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 6
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 12/04/2014
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response We were using PCINE guidance.
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: We used MassDOT and FDOT as a starting point
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
	Other

NEW HAMPSHIRE

Are your PT structures designed for a specific service life?	NO
	YES, What is the design service life (number of years)? 75
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO NO
	YES
	YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response Pre-bagged to meet specific physical properties stated in spec.
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO NO
	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO NO
	YES, Please provide a link:
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO NO
	YES, Please provide a link:

NEW HAMPSHIRE

Who performs repairs? Please check all that apply.	In-house staff	In-house staff
	Contractor	Contractor
	Other. Please describe:	handle the smaller type bridges but if the bridge is too big we would
Has your agency encountered issues requiring repair during construction?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	
	During construction	
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	
	Invasive inspection of PT system	
	Repair of pour-back (anchor block-out)	
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	

NEW HAMPSHIRE

Does your agency have established inspection procedures specific to PT bridges?	<div>NO</div> <div>NO</div>	
Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	<div>YES, Please provide a link or location where procedure can be accessed:</div> <div>Visual methods</div> <div>Magnetic methods (i.e., magnetic flux leakage)</div> <div>Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)</div> <div>Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)</div> <div>Direct measurement of tendon force (i.e. gages on strands)</div> <div>Radiation methods (i.e., x-ray diffraction, radiography)</div> <div>Electrochemical techniques (i.e., half-cell potential)</div> <div>Other, or not sure how to classify. Please describe:</div>	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	<div>ASBI grouting certification</div> <div>PTI Level 1 installer</div> <div>PTI Level 2 installer</div> <div> <div>A qualified rep of the post-tensioning manufacturer per specification. On the projects that I designed, I believe they had ASBI certification.</div> <div>Other, please describe:</div> </div>	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<div>Open-Ended Response</div> <div>I will send you the special provision that we use that has this information.</div>	

NEW HAMPSHIRE

Does your agency have grout storage requirements?	<div>NO</div> <div>NO</div> <div>YES, Please specify guiding document, provide link, or describe:</div>
Who conducts QA? Please check all that apply.	<div>Contractor</div> <div>In-house</div> <div>In-house</div> <div>Consultant inspection (CEI)</div> <div>Consultant inspection (CEI)</div> <div>Other, please specify:</div>
Who conducts QC? Please check all that apply.	<div>Contractor</div> <div>Contractor</div> <div>In-house</div> <div>Consultant inspection (CEI)</div> <div>Other, please specify:</div>
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	<div>Open-Ended Response</div> <div> https://www.pci.org/PCINE/Technical_Resources/Bridge_Resources/Bridge_Deck_Panels/PCINE/Technical_Resources/Bridge_Resources/Bridge_Deck_Panels.aspx?hkey=70534732-9293-4eea-bf89-503c3cf492df </div>
Have you encountered problematic PT construction details?	<div>YES</div> <div>YES</div> <div>NO</div>
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	<div>Anchorage pour-back details</div> <div>Mid-tendon vents</div> <div>Inspection ports</div> <div>Duct placement</div> <div>Duct placement</div> <div>Duct splicing</div> <div>Duct splicing</div> <div>Heat-shrink sleeves</div> <div>Confinement reinforcement</div> <div>Segment mating during erection</div> <div>Match-cast joints</div> <div>Precast quality</div> <div>Deck drainage details</div> <div>Other. Please describe:</div>
Have you encountered problematic construction techniques/methods?	<div>YES</div> <div>YES</div> <div>NO</div>

NEW HAMPSHIRE

Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify. Alignment of panels and decks.	
Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	
Please identify materials which have been problematic. Please check all that apply.	Grout filler material Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response N/A	
How have you rectified these issues?	Open-Ended Response N/A	
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	

NEW MEXICO	
Name(s)	
Title(s)	State Bridge Load Rating Engineer
Agency	New Mexico Department of Trnasportation
State/Province	NM
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 13
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/1930
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response N/A
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link: Unknown
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:

NEW MEXICO

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	
	Spliced girder	
	Other	
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	75
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	520.2.5 Grout The Contractor shall provide pre-packaged grout with minimum 28-day compressive strength of 6000 psi. The Contractor shall use grout specifically manufactured for grouting of post-tensioning ducts, and approved by the Project Manager prior to use.
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	NO
	YES	
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	

NEW MEXICO

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	

NEW MEXICO

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

NO

YES, Please provide a link or location where procedure can be accessed:

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods

Magnetic methods (i.e., magnetic flux leakage)

Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)

Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)

Direct measurement of tendon force (i.e. gages on strands)

Radiation methods (i.e., x-ray diffraction, radiography)

Electrochemical techniques (i.e., half-cell potential)

Other, or not sure how to classify. Please describe:

NEW MEXICO

<p>Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.</p>	ASBI grouting certification	
	PTI Level 1 installer	PTI Level 1 installer
	PTI Level 2 installer	
	Other, please describe:	
<p>Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.</p>	Open-Ended Response	
<p>Does your agency have grout storage requirements?</p>	NO NO	
	YES, Please specify guiding document, provide link, or describe:	
<p>Who conducts QA? Please check all that apply.</p>	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
<p>Who conducts QC? Please check all that apply.</p>	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
<p>Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.</p>	Open-Ended Response	
<p>Have you encountered problematic PT construction details?</p>	YES YES	
	NO	

NEW MEXICO

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe: interior upper corners of segmental box girders; possible link to	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	
	NO	NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	

NEW MEXICO

How have you rectified these issues?

Open-Ended Response

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

NEW YORK

Name(s)	
Title(s)	
Agency	NYS Department of Transportation
State/Province	NY
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 1
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures Concerns related to quality/durability Expense Time consuming design/construction Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 05/01/2018
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response PTI M50 PTI M55
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50 PTI M55 PTI M55 In-house/DOT created specifications In-house/DOT created specifications Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental Precast segmental Precast segmental Cast-in-place, non-segmental PT decks PT decks PT slab bridges Box girders Pier caps Pier caps Spliced girder Spliced girder Other

NEW YORK

Are your PT structures designed for a specific service life?	NO
	YES, What is the design service life (number of years)? 75
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO
	YES
	YES, What is the level specified? PL-2 PTI M50
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response Prepackaged cementitious, no metallic expansion aides w/c <= 0.40
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO
	YES YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
	Other Prestressed precast girders
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO NO
	YES, Please provide a link:
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO NO
	YES, Please provide a link:
Who performs repairs? Please check all that apply.	In-house staff
	Contractor Contractor
	Other. Please describe:

NEW YORK

Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	
	YES, Please describe issue and performed repair:	required repairs to reduce chloride infiltration and required external PT
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	
	YES, Please describe issue and performed repair:	removed 2" replaced with overlay
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	Member strengthening to address corrosion/impact damage
	Re-grouting of tendons	Re-grouting of tendons
	During construction	
	At a later stage when structure in-service	At a later stage when structure in-service
	NDT-aided inspection of PT system	NDT-aided inspection of PT system
	Invasive inspection of PT system	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)	Repair of pour-back (anchor block-out)
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	Crack injection
	Repair or replacement of deck on a PT superstructure	Repair or replacement of deck on a PT superstructure
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	External/unbonded tendon replacement
	Other. Please specify:	
	Does your agency have established inspection procedures specific to PT bridges?	NO
YES, Please provide a link or location where procedure can be accessed:		YES

NEW YORK

<p>Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.</p>	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
<p>Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.</p>	ASBI grouting certification	
	PTI Level 1 installer	
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
<p>Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.</p>		
	Open-Ended Response	Engineer in Charge monitors all aspects of construction
<p>Does your agency have grout storage requirements?</p>	NO	NO
	YES, Please specify guiding document, provide link, or describe:	

NEW YORK

Who conducts QA? Please check all that apply.	Contractor	Contractor
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	
	NO	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	

NEW YORK

Have you found encountered issues with any of the materials used in PT construction?	YES
	NO NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response
How have you rectified these issues?	Open-Ended Response
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	<div>Open-Ended Response</div> <div>I-81 (NB & SB) over the Oneida River Syracuse, NY structure required external PT</div>

NORTH CAROLINA

Name(s)	
Title(s)	Bridge Engineer
Agency	NCDOT Structures Management Unit
State/Province	NC
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 11
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2020
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link: NCDOT Specifications
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:

NORTH CAROLINA

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	PT decks
	PT slab bridges	
	Box girders	
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	100
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response prebagged	
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	Spliced girder
	Other	

NORTH CAROLINA	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO NO
	YES, Please provide a link:
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO NO
	YES, Please provide a link:
Who performs repairs? Please check all that apply.	In-house staff
	Contractor Contractor
	Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO
	<p>Improper dunnage for storage of precast segment that damaged bottom slab of box segment: Repaired bottom slab by removal of portion of slab and replaced with cast in place concrete.</p> <p>- Damage ducts at segment joints: Repaired by reshaping ducts or partial removal & replacement with splices and/or heat shrink.</p> <p>- Blocked or Miss-Aligned Duct: Repaired by coring, ramming, or partial replacement</p> <p>- Poor quality grout cap & other block out pour backs: Repaired by removal of Poor quality materials and replacement.</p> <p>- Missing grout cap: Repaired by cutting access hole in concrete to install cap in one or more pieces. Broken or Missing shear key on match cast faces: Repaired with grout after segment erection.</p> <p>- Shrinkage cracking in cast in place closure pours: Repaired by crack injections and HMWM coating.</p> <p>- Missing or damaged grout port/vent: Repaired by field drilling ports & access holes.</p> <p>- Honeycombs & voids in precast Members: Repaired by chipping out voided areas and pour back with CIP concrete, grout, epoxy grouts, etc.</p> <p>YES, Please describe issue and performed repair:</p>

NORTH CAROLINA

Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	
	YES, Please describe issue and performed repair: anchorage blockouts	
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	Re-grouting of tendons
	During construction	During construction
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	NDT-aided inspection of PT system
	Invasive inspection of PT system	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)	Repair of pour-back (anchor block-out)
	FRP wrapping	
	Injection of corrosion inhibitor	Injection of corrosion inhibitor
	Crack injection	Crack injection
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	
	Does your agency have established inspection procedures specific to PT bridges?	NO
YES, Please provide a link or location where procedure can be accessed: Project specific		

NORTH CAROLINA

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	Direct measurement of tendon force (i.e. gages on strands)
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	PTI Level 1 installer
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<p>There is not a set or standard stand alone procedure(s). Procedures tend to be project specific and are derived from Contract Project Special Provisions, ASBI/FHWA Publications, PTI publications, Contractor & Producers work plans, Engineer & Technician past experiences. etc.</p> <p>Open-Ended Response</p>	
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe:	approved pre-packaged grout that exhibits thixotropic properties and is

NORTH CAROLINA

Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	YES
	NO	
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	Anchorage pour-back details
	Mid-tendon vents	Mid-tendon vents
	Inspection ports	Inspection ports
	Duct placement	Duct placement
	Duct splicing	Duct splicing
	Heat-shrink sleeves	Heat-shrink sleeves
	Confinement reinforcement	Confinement reinforcement
	Segment mating during erection	Segment mating during erection
	Match-cast joints	Match-cast joints
	Precast quality	Precast quality
	Deck drainage details	Deck drainage details
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	YES
	NO	
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	Air (pressure) test
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	Deck-level vent removal/permanent vent cap placement
	Permanent grout cap placement	Permanent grout cap placement
	Grouting/filler procedures	Grouting/filler procedures
	Vacuum grouting	Vacuum grouting
	Preparing anchorage area for block-out pour	Preparing anchorage area for block-out pour
	Other. Please specify.	

NORTH CAROLINA

Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	Prestressing steel
	Elastomeric coatings	Elastomeric coatings
	Epoxy grouts	Epoxy grouts
	Pour-back materials	Pour-back materials
Other, please specify:		
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	
How have you rectified these issues?	Open-Ended Response	
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	

NORTH DAKOTA

Name(s)	
Title(s)	Assistant Bridge Engineer
Agency	NDDOT
State/Province	ND
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 1
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
Other	

NORTH DAKOTA

Are your PT structures designed for a specific service life?	NO
	YES, What is the design service life (number of years)?
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO
	YES
	YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO
	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO
	YES, Please provide a link:
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO
	YES, Please provide a link:
Who performs repairs? Please check all that apply.	In-house staff
	Contractor
	Other. Please describe:

NORTH DAKOTA

Has your agency encountered issues requiring repair during construction?	NO
	YES, Please describe issue and performed repair:
Has your agency encountered issues requiring repair related to corrosion?	NO
	YES, Please describe issue and performed repair:
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO
	YES, Please describe issue and performed repair:
Has your agency performed repair/replacement of decks on PT bridges?	NO
	YES, Please describe issue and performed repair:
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage
	Re-grouting of tendons
	During construction
	At a later stage when structure in-service
	NDT-aided inspection of PT system
	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)
	FRP wrapping
	Injection of corrosion inhibitor
	Crack injection
	Repair or replacement of deck on a PT superstructure
	Internal/bonded tendon replacement
	External/unbonded tendon replacement
	Other. Please specify:
Does your agency have established inspection procedures specific to PT bridges?	NO
	YES, Please provide a link or location where procedure can be accessed:

NORTH DAKOTA

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)
	Radiation methods (i.e., x-ray diffraction, radiography)
	Electrochemical techniques (i.e., half-cell potential)
	Other, or not sure how to classify. Please describe:
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification
	PTI Level 1 installer
	PTI Level 2 installer
	Other, please describe:
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response
Does your agency have grout storage requirements?	NO
	YES, Please specify guiding document, provide link, or describe:
Who conducts QA? Please check all that apply.	Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:

NORTH DAKOTA

Who conducts QC? Please check all that apply.	Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response
Have you encountered problematic PT construction details?	YES
	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details
	Mid-tendon vents
	Inspection ports
	Duct placement
	Duct splicing
	Heat-shrink sleeves
	Confinement reinforcement
	Segment mating during erection
	Match-cast joints
	Precast quality
	Deck drainage details
	Other. Please describe:
Have you encountered problematic construction techniques/methods?	YES
	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test
	Vacuum test
	Deck-level vent removal/permanent vent cap placement
	Permanent grout cap placement
	Grouting/filler procedures
	Vacuum grouting
	Preparing anchorage area for block-out pour
	Other. Please specify.

NORTH DAKOTA

Have you found encountered issues with any of the materials used in PT construction?	YES
	NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response
How have you rectified these issues?	Open-Ended Response
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response

OHIO	
Name(s)	
Title(s)	OSE Administrator, Bridge Engineer
Agency	Ohio DOT
State/Province	OH
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 83
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 04/20/2018
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response FHWA PT tendon instillation and grouting manual. ASBI specification guide and construction practice handbook. PTI M55. FHWA - HRT -13-028
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: Florida DOT specifications

OHIO

What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	PT decks
	PT slab bridges	
	Box girders	
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	Post tensioned hold downs at end pier
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	999
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	Grouts are accepted based upon meeting the property requirements listed in the supplemental specification.
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
	Other	Straddle Bent Pier Cap *not included in survey but from outside knowledge

OHIO

Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	<div style="display: flex; justify-content: space-between; margin-bottom: 10px;"> NO NO </div> <div>YES, Please provide a link:</div>
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	<div style="display: flex; justify-content: space-between; margin-bottom: 10px;"> NO NO </div> <div>YES, Please provide a link:</div>
Who performs repairs? Please check all that apply.	<div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> In-house staff </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> Contractor Contractor </div> <div>Other. Please describe:</div>
Has your agency encountered issues requiring repair during construction?	<div style="display: flex; justify-content: space-between; margin-bottom: 10px;"> NO </div> <div style="display: flex; justify-content: space-between;"> <div>YES, Please describe issue and performed repair:</div> <div>External PT duct failed during grouting</div> </div>
Has your agency encountered issues requiring repair related to corrosion?	<div style="display: flex; justify-content: space-between; margin-bottom: 10px;"> NO </div> <div style="display: flex; justify-content: space-between;"> <div>YES, Please describe issue and performed repair:</div> <div>Voids in PT ducts to be regouted with vacuum grouting. Using Vector Corrosion Post-Tech to mitigate corrosion. Replacing anchorage pour backs.</div> </div>
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	<div style="display: flex; justify-content: space-between; margin-bottom: 10px;"> NO NO </div> <div>YES, Please describe issue and performed repair:</div>
Has your agency performed repair/replacement of decks on PT bridges?	<div style="display: flex; justify-content: space-between; margin-bottom: 10px;"> NO </div> <div style="display: flex; justify-content: space-between;"> <div>YES, Please describe issue and performed repair:</div> <div> ODOT answer = No. Note: Decks containing PT in deck receive a new overlay approximately every 10 years. </div> </div>

OHIO

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage	
Re-grouting of tendons	Re-grouting of tendons
During construction	During construction
At a later stage when structure in-service	
NDT-aided inspection of PT system	NDT-aided inspection of PT system
Invasive inspection of PT system	Invasive inspection of PT system
Repair of pour-back (anchor block-out)	Repair of pour-back (anchor block-out)
FRP wrapping	
Injection of corrosion inhibitor	Injection of corrosion inhibitor
Crack injection	
Repair or replacement of deck on a PT superstructure	
Internal/bonded tendon replacement	
External/unbonded tendon replacement	
Other. Please specify:	

Does your agency have established inspection procedures specific to PT bridges?

NO
YES, Please provide a link or location where procedure can be accessed:

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods	Visual methods
Magnetic methods (i.e., magnetic flux leakage)	Magnetic methods (i.e., magnetic flux leakage)
Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
Direct measurement of tendon force (i.e. gages on strands)	
Radiation methods (i.e., x-ray diffraction, radiography)	
Electrochemical techniques (i.e., half-cell potential)	
Other, or not sure how to classify. Please describe:	

OHIO

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	PTI Level 1 installer
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response	http://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/855_04202018_for_2019.pdf
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe:	See section 855.08.C.7 Grout storage of 855 supplemental specification. (link in question above)
Who conducts QA? Please check all that apply.	Contractor	Contractor
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	N/A
Have you encountered problematic PT construction details?	YES	YES
	NO	

OHIO

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details	
Mid-tendon vents	Mid-tendon vents
Inspection ports	
Duct placement	
Duct splicing	Duct splicing
Heat-shrink sleeves	Heat-shrink sleeves
Confinement reinforcement	
Segment mating during erection	
Match-cast joints	
Precast quality	
Deck drainage details	
Other. Please describe:	

Have you encountered problematic construction techniques/methods?

YES	YES
NO	

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test	Air (pressure) test
Vacuum test	
Deck-level vent removal/permanent vent cap placement	Deck-level vent removal/permanent vent cap placement
Permanent grout cap placement	
Grouting/filler procedures	
Vacuum grouting	
Preparing anchorage area for block-out pour	
Other. Please specify.	

Have you found encountered issues with any of the materials used in PT construction?

YES	YES
NO	

Please identify materials which have been problematic. Please check all that apply.

Grout filler material	
Flexible filler material (non-cementitious, wax, grease, etc.)	
Prestressing steel	
Elastomeric coatings	
Epoxy grouts	
Pour-back materials	Pour-back materials
Other, please specify:	

OHIO

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

How have you rectified these issues?

Open-Ended Response

Currently under construction

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

N/A

OKLAHOMA	
Name(s)	
Title(s)	Assistant Bridge Engineer - Maintenance
Agency	ODOT
State/Province	OK
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 37
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 12/16/2009
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response Florida DOT Specifications
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: Florida
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges
	Box girders
	Pier caps Pier caps
	Spliced girder
	Other

OKLAHOMA

Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response pre-bagged,	
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	Pier caps
	Spliced girder	
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	

OKLAHOMA		
Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	repaired and strengthened the anchor - successfully tensioned
Has your agency encountered issues requiring repair related to corrosion?	NO	
	YES, Please describe issue and performed repair:	Isolated incidents of corrosion in tendons.
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO NO	
	YES, Please describe issue and performed repair:	
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	Re-grouting of tendons
	During construction	
	At a later stage when structure in-service	At a later stage when structure in-service
	NDT-aided inspection of PT system	NDT-aided inspection of PT system
	Invasive inspection of PT system	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)	Repair of pour-back (anchor block-out)
	FRP wrapping	FRP wrapping
	Injection of corrosion inhibitor	Injection of corrosion inhibitor
	Crack injection	
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	
	Does your agency have established inspection procedures specific to PT bridges?	NO NO
YES, Please provide a link or location where procedure can be accessed:		

OKLAHOMA

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	Magnetic methods (i.e., magnetic flux leakage)
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response	Test tendons with compressed air to determine if duct connections need repair. Perform fluidity tests for grout.
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	
Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	

OKLAHOMA	
Who conducts QC? Please check all that apply.	Contractor Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	<div></div> <div>Open-Ended Response</div> <div>Location of grout inlets and outlets includes duct high points 3' upstream and downstream</div>
Have you encountered problematic PT construction details?	YES YES
	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details Anchorage pour-back details
	Mid-tendon vents
	Inspection ports
	Duct placement
	Duct splicing
	Heat-shrink sleeves
	Confinement reinforcement
	Segment mating during erection
	Match-cast joints
	Precast quality
	Deck drainage details
	Other. Please describe:
	Have you encountered problematic construction techniques/methods?
NO NO	
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test
	Vacuum test
	Deck-level vent removal/permanent vent cap placement
	Permanent grout cap placement
	Grouting/filler procedures
	Vacuum grouting
	Preparing anchorage area for block-out pour
	Other. Please specify.
Have you found encountered issues with any of the materials used in PT construction?	YES
	NO NO

OKLAHOMA

Please identify materials which have been problematic. Please check all that apply.

Grout filler material

Flexible filler material (non-cementitious, wax, grease, etc.)

Prestressing steel

Elastomeric coatings

Epoxy grouts

Pour-back materials

Other, please specify:

What specific problems with deterioration of CIP post-tensioned bridges have you encountered?

Open-Ended Response

Grout voids

How have you rectified these issues?

Open-Ended Response

Inspection using boroscoping, grout evaluation, and filling grout voids

Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?

NO

NO

YES, Please describe how it was performed:

If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):

Open-Ended Response

Grout repairs: 224265542
0210WX04OKLAHOMAI-
235 SBNE16TH
PL/23RDST/RR/RAMP

OREGON

Name(s)	
Title(s)	Prestressed Concrete Standards Engineer
Agency	Oregon Department of Transportation
State/Province	OR
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 220
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/31/2017
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response ASBI/PTI M50 and PTI M55
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges
	Box girders Box girders
	Pier caps Pier caps
	Spliced girder Spliced girder
	Other PT arch ribs

OREGON

Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)? 75	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO NO	
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	commercial, pre-packaged, thixotropic tendon grout
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	PT decks
	PT slab bridges	
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO NO	
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO NO	
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	In-house staff
	Contractor	Contractor
	Other. Please describe:	

OREGON

	NO	
Has your agency encountered issues requiring repair during construction?	<div style="text-align: right;"> <p>1) After tensioning, cracks occurred in PT box stems due to poor quality of formwork and shifted PT ducts during concrete pour. On the same project, rebar cages were not built per specs. The PT box stems were re-constructed. 2) Grout leak during grouting. The leak spots were sealed. 3) Voids in grout were found using probing. Grouting was stopped and couldn't push it through from the original side later. The subsequent grouting was done from the opposite side. So, the probing was conducted. Small holes were drilled and grout was injected afterward. 4) Rebar cages shift caused side concrete cover issue. 5) Over tensioning was done and caused cracks in PT decks. Some decks were re-cast and some received epoxy injection.</p> </div>	
Has your agency encountered issues requiring repair related to corrosion?	NO NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO NO	
	YES, Please describe issue and performed repair:	

OREGON

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	Member strengthening to address corrosion/impact damage
	Re-grouting of tendons	Re-grouting of tendons
	During construction	During construction
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	NDT-aided inspection of PT system
	Invasive inspection of PT system	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)	
	FRP wrapping	FRP wrapping
	Injection of corrosion inhibitor	
	Crack injection	Crack injection
	Repair or replacement of deck on a PT superstructure	Repair or replacement of deck on a PT superstructure
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	External/unbonded tendon replacement
	Other. Please specify:	
Does your agency have established inspection procedures specific to PT bridges?	NO	NO
	YES, Please provide a link or location where procedure can be accessed:	
Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	Electrochemical techniques (i.e., half-cell potential)
	Other, or not sure how to classify. Please describe:	

OREGON

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response https://www.oregon.gov/odot/Business/Documents/2018_STANDARD_SPECIFICATIONS.pdf Please look for Section 00555.	
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	
Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	YES
	NO	

OREGON

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	Duct placement
	Duct splicing	Duct splicing
	Heat-shrink sleeves	
	Confinement reinforcement	Confinement reinforcement
	Segment mating during erection	
	Match-cast joints	
	Precast quality	Precast quality
	Deck drainage details	
	Other. Please describe:	interfered with reinforcing bars. Use of non-metal PT ducts.
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	

OREGON

Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
	Other, please specify: Non-metal PT ducts.	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	Cracking along PT ducts Cold joint cracking in spliced girder bridges Voids in PT ducts
How have you rectified these issues?	Open-Ended Response	are small. When cracks increase to a certain size, causes will be
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	NA

PENNSYLVANIA

Name(s)	
Title(s)	Chief Bridge Engineer
Agency	PennDOT
State/Province	PA
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 37
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2019
What were the reference documents used for updating? Please specify/explain:	<p>Publication 15 (Design Manual-4 Structures, Section 5.9.5,5.12.5.3.9 &5.12.5; Publication 218-Bridge Design standards, Publication 219-Bridge Construction standards, Publication 408- Highway Construction Specifications Section 1000 - Structures, Section 1100- Manufactured Materials, Section 1108 - Post Tensioning Operations</p> <p>Open-Ended Response</p>
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50 ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications
	Other, please provide a link:

PENNSYLVANIA

Are your PT specifications very similar to or derived from another state's?	<div>NO</div> <div>NO</div>
What type of PT structures are in your inventory? Please check all that apply.	YES, Please specify source:
	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	<div>Pier caps</div> <div>Pier caps</div> <div>Spliced girder</div> <div>Spliced girder</div> <div>Other</div>
Are your PT structures designed for a specific service life?	NO
	<div>YES, What is the design service life (number of years)?</div> <div>100</div>
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO
	YES
	<div>YES, What is the level specified?</div> <div>PL-2 or PL-3</div>
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	<div>Open-Ended Response</div> <div>prebagged, please refer to BC-790M. http://www.dot.state.pa.us/public/Bureaus/BOPD/Bridge/2019/BC/BC790M.pdf</div>
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	<div>NO</div> <div>NO</div>
	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	<div>Spliced girder</div> <div>Other</div>

PENNSYLVANIA

<p>Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?</p>	<p>NO</p> <p>Publication 15 (Design Manual-4 Structures, Section 5.9.5, 5.12.5.3.9 & 5.12.5; Publication 218-Bridge Design standards, Publication 219-Bridge Construction standards, Publication 408- Highway Construction Specifications Section 1000 - Structures, Section 1100-Manufactured Materials, Section 1108 - Post Tensioning Operations http://www.dot.state.pa.us/public/Bureaus/BOPD/Bridge/NewProducts/drawings/NP59.pdf http://www.dot.state.pa.us/public/Bureaus/BOPD/Bridge/NewProducts/drawings/NP74.pdf</p> <p>YES, Please provide a link:</p>
<p>Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?</p>	<p>NO NO</p> <p>YES, Please provide a link:</p>
<p>Who performs repairs? Please check all that apply.</p>	<p>In-house staff</p> <p>Contractor</p> <p>Other. Please describe: N/a</p>
<p>Has your agency encountered issues requiring repair during construction?</p>	<p>NO NO</p> <p>YES, Please describe issue and performed repair:</p>
<p>Has your agency encountered issues requiring repair related to corrosion?</p>	<p>NO NO</p> <p>YES, Please describe issue and performed repair:</p>
<p>Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?</p>	<p>NO NO</p> <p>YES, Please describe issue and performed repair:</p>
<p>Has your agency performed repair/replacement of decks on PT bridges?</p>	<p>NO NO</p> <p>YES, Please describe issue and performed repair:</p>

PENNSYLVANIA

Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.

Member strengthening to address corrosion/impact damage

Re-grouting of tendons

During construction

At a later stage when structure in-service

NDT-aided inspection of PT system

Invasive inspection of PT system

Repair of pour-back (anchor block-out)

FRP wrapping

Injection of corrosion inhibitor

Crack injection

Repair or replacement of deck on a PT superstructure

Internal/bonded tendon replacement

External/unbonded tendon replacement

Other. Please specify:

Does your agency have established inspection procedures specific to PT bridges?

NO

YES, Please provide a link or location where procedure can be accessed: Project specific

PENNSYLVANIA

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	Magnetic methods (i.e., magnetic flux leakage)
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	Radiation methods (i.e., x-ray diffraction, radiography)
	Electrochemical techniques (i.e., half-cell potential)	Electrochemical techniques (i.e., half-cell potential)
	Other, or not sure how to classify. Please describe:	report: http://www.dot7.state.pa.us/BPR_P
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	Professional Engineer with Post Tensioning Operational Experience or PTI Level 2 with minimum 3 years post tensioning experience or ASBI certification with 3 years experience. Per Publication 408, Section 1108.01.
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<div> http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2020/408_2020_IE/408_2020_IE.pdf http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2020/408_2020_IE/408_2020_IE.pdf </div>	
	Open-Ended Response	

PENNSYLVANIA

Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe:	http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2020/408_2020_IE/408_2020_IE.pdf
Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	Please refer to question regarding standard plans.
Have you encountered problematic PT construction details?	YES	
	NO	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO

PENNSYLVANIA

Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	
	NO	NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
Other, please specify:		
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	N/a
How have you rectified these issues?	Open-Ended Response	N/a
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	N/a

RHODE ISLAND

Name(s)	
Title(s)	Managing Engineer
Agency	Department of Transportation
State/Province	RI
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO	
	YES, please specify approximate quantity: 2	
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures	
	Concerns related to quality/durability	
	Expense	
	Time consuming design/construction	
	Other, Please describe:	
When were your PT Specifications last updated (approximately)?	Date	12/31/2007
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response	AASHTO LRFD Bridge Construction Specifications
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50	ASBI/PTI M50
	PTI M55	PTI M55
	In-house/DOT created specifications	In-house/DOT created specifications
	Other, please provide a link:	AASHTO LRFD Bridge Construction Specifications
Are your PT specifications very similar to or derived from another state's?	NO	
	YES, Please specify source:	Massachusetts' Highway Department
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	Box girders
	Pier caps	
	Spliced girder	Spliced girder
	Other	

RHODE ISLAND

Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	PL-2
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	Pre-bagged grouts mixed with water to obtain W/C ratio specified Thixotropic grout property for even distribution within the ducts
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	Spliced girder
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	

RHODE ISLAND

Has your agency encountered issues requiring repair during construction?	<div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> NO For both segmental girder and box girder construction, voids in ducts were refilled with grout. Ports were used to ensure that the ducts were entirely filled with grout. Exterior post tensioning exterior Bulb-Tee girder to gain more capacity due to manufacturing defect and drilling through tendon ducts cutting some strands. </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> YES, Please describe issue and performed repair: </div>
Has your agency encountered issues requiring repair related to corrosion?	<div style="display: flex; justify-content: space-between;"> NO NO </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> YES, Please describe issue and performed repair: </div>
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	<div style="display: flex; justify-content: space-between;"> NO NO </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> YES, Please describe issue and performed repair: </div>
Has your agency performed repair/replacement of decks on PT bridges?	<div style="display: flex; justify-content: space-between;"> NO NO </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> YES, Please describe issue and performed repair: </div>
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	<div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> Member strengthening to address corrosion/impact damage </div> <div style="display: flex; justify-content: space-between;"> Re-grouting of tendons Re-grouting of tendons </div> <div style="display: flex; justify-content: space-between;"> During construction During construction </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> At a later stage when structure in-service </div> <div style="display: flex; justify-content: space-between;"> NDT-aided inspection of PT system NDT-aided inspection of PT system </div> <div style="display: flex; justify-content: space-between;"> Invasive inspection of PT system Invasive inspection of PT system </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> Repair of pour-back (anchor block-out) </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> FRP wrapping </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> Injection of corrosion inhibitor </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> Crack injection </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> Repair or replacement of deck on a PT superstructure </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> Internal/bonded tendon replacement </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> External/unbonded tendon replacement </div> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between;"> Other. Please specify: </div>

RHODE ISLAND

Does your agency have established inspection procedures specific to PT bridges?

NO NO

YES, Please provide a link or location where procedure can be accessed:

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.

Visual methods Visual methods

Magnetic methods (i.e., magnetic flux leakage)

vibration methods (i.e., acoustic emission, impact echo, ultrasonic) vibration methods (i.e., acoustic emission, impact echo, ultrasonic)

(i.e., infrared thermography, impulse radar, ground penetrating radar)

Direct measurement of tendon force (i.e. gages on strands)

Radiation methods (i.e., x-ray diffraction, radiography)

Electrochemical techniques (i.e., half-cell potential)

Other, or not sure how to classify. Please describe:

Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.

ASBI grouting certification

PTI Level 1 installer

PTI Level 2 installer PTI Level 2 installer

Other, please describe:

Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.

Open-Ended Response

Use of thixotropic grout property for even distribution within the ducts, Addition of downstream grout vents at high points to allow air to escape. Use of high speed mixer. On site testing with certified inspectors on site.

Does your agency have grout storage requirements?

NO NO

YES, Please specify guiding document, provide link, or describe:

RHODE ISLAND

Who conducts QA? Please check all that apply.	Contractor	Contractor
	In-house	
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	
	NO	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	

RHODE ISLAND

Have you found encountered issues with any of the materials used in PT construction?	YES
	NO NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response N/A
How have you rectified these issues?	Open-Ended Response N/A
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response Non

SOUTH CAROLINA

Name(s)	
Title(s)	District Bridge Engineer
Agency	SCDOT
State/Province	SC
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 4
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 03/01/2019
What were the reference documents used for updating? Please specify/explain:	FLDOT specifications were used as a basis for contract special provisions Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: FLDOT
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder Spliced girder
	Other

SOUTH CAROLINA

Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	100
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	prebagged
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	PT decks
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	Epoxy repair of widespread cracking to PT decks.

SOUTH CAROLINA

Has your agency encountered issues requiring repair related to corrosion?	NO	
	YES, Please describe issue and performed repair:	Numerous repairs to Wando River Bridge related to water intrusion and subsequent corrosion. Filling open Grout vent tubes, methacrylate application, tendon replacement, supplemental tendons, anti corrosion impregnation. HDPE and anchorage repairs and coating.
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	
	YES, Please describe issue and performed repair:	epoxy filling cracking that occurred during construction
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	Member strengthening to address corrosion/impact damage
	Re-grouting of tendons	
	During construction	
	At a later stage when structure in-service	At a later stage when structure in-service
	NDT-aided inspection of PT system	NDT-aided inspection of PT system
	Invasive inspection of PT system	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)	Repair of pour-back (anchor block-out)
	FRP wrapping	
	Injection of corrosion inhibitor	Injection of corrosion inhibitor
	Crack injection	Crack injection
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	External/unbonded tendon replacement
	Other. Please specify:	
	Does your agency have established inspection procedures specific to PT bridges?	NO
YES, Please provide a link or location where procedure can be accessed:		

SOUTH CAROLINA

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	Magnetic methods (i.e., magnetic flux leakage)
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	Electrochemical techniques (i.e., half-cell potential)
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	project specific
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<div> <div>Open-Ended Response</div> <div>project specific but generally follow FLDOT specifications</div> </div>	
Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe: Generally follow FLDOT	

SOUTH CAROLINA

Who conducts QA? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	YES
	NO	
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	Anchorage pour-back details
	Mid-tendon vents	Mid-tendon vents
	Inspection ports	
	Duct placement	
	Duct splicing	Duct splicing
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	

SOUTH CAROLINA

Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	Pour-back materials
Other, please specify:		
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	
How have you rectified these issues?	Open-Ended Response	
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	Wando River Bridge, I-526 Charleston SC. Corrosion of external tendons.

SOUTH DAKOTA

Name(s)	
Title(s)	Chief Bridge Engineer
Agency	SDDOT
State/Province	SD
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	<div style="display: flex; justify-content: space-between;"> NO NO </div>
	YES, please specify approximate quantity:
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe: Have not had need for Post Tensioning
When were your PT Specifications last updated (approximately)?	Date
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
Other	

SOUTH DAKOTA

Are your PT structures designed for a specific service life?	NO
	YES, What is the design service life (number of years)?
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO
	YES
	YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO
	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
	Other
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO
	YES, Please provide a link:
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO
	YES, Please provide a link:
Who performs repairs? Please check all that apply.	In-house staff
	Contractor
	Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO
	YES, Please describe issue and performed repair:

SOUTH DAKOTA

Has your agency encountered issues requiring repair related to corrosion?	NO
	YES, Please describe issue and performed repair:
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO
	YES, Please describe issue and performed repair:
Has your agency performed repair/replacement of decks on PT bridges?	NO
	YES, Please describe issue and performed repair:
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage
	Re-grouting of tendons
	During construction
	At a later stage when structure in-service
	NDT-aided inspection of PT system
	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)
	FRP wrapping
	Injection of corrosion inhibitor
	Crack injection
	Repair or replacement of deck on a PT superstructure
	Internal/bonded tendon replacement
External/unbonded tendon replacement	
Other. Please specify:	
Does your agency have established inspection procedures specific to PT bridges?	NO
	YES, Please provide a link or location where procedure can be accessed:

SOUTH DAKOTA

<p>Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.</p>	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)
	Radiation methods (i.e., x-ray diffraction, radiography)
	Electrochemical techniques (i.e., half-cell potential)
	Other, or not sure how to classify. Please describe:
<p>Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.</p>	ASBI grouting certification
	PTI Level 1 installer
	PTI Level 2 installer
	Other, please describe:
<p>Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.</p>	
	Open-Ended Response
<p>Does your agency have grout storage requirements?</p>	NO
	YES, Please specify guiding document, provide link, or describe:
<p>Who conducts QA? Please check all that apply.</p>	Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
<p>Who conducts QC? Please check all that apply.</p>	Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:

SOUTH DAKOTA

<p>Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.</p>	 Open-Ended Response
<p>Have you encountered problematic PT construction details?</p>	YES NO
<p>Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.</p>	Anchorage pour-back details Mid-tendon vents Inspection ports Duct placement Duct splicing Heat-shrink sleeves Confinement reinforcement Segment mating during erection Match-cast joints Precast quality Deck drainage details Other. Please describe:
<p>Have you encountered problematic construction techniques/methods?</p>	YES NO
<p>Please identify construction methods that are problematic. Please check all that apply.</p>	Air (pressure) test Vacuum test Deck-level vent removal/permanent vent cap placement Permanent grout cap placement Grouting/filler procedures Vacuum grouting Preparing anchorage area for block-out pour Other. Please specify.
<p>Have you found encountered issues with any of the materials used in PT construction?</p>	YES NO

SOUTH DAKOTA

Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response
How have you rectified these issues?	Open-Ended Response
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response

TEXAS	
Name(s)	
Title(s)	Transportation Engineer
Agency	TxDOT
State/Province	TX
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 20
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2014
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response PTI M55 PTI/ASBI M50
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source:
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges PT slab bridges
	Box girders Box girders
	Pier caps Pier caps
	Spliced girder Spliced girder
Other	

TEXAS

Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)? 100	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	Per Departmental Material Specification through Material Producer List
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	PT decks
	PT slab bridges	PT slab bridges
	Box girders	
	Pier caps	
	Spliced girder	Spliced girder
	Other	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO NO	
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO NO	
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	

TEXAS

Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	PT strand replacement, Vacuum Grouting, Bad Grout, Spalling due to PT duct clearance
Has your agency encountered issues requiring repair related to corrosion?	NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	
	YES, Please describe issue and performed repair:	
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	Re-grouting of tendons
	During construction	During construction
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	
	Invasive inspection of PT system	
	Repair of pour-back (anchor block-out)	Repair of pour-back (anchor block-out)
	FRP wrapping	
	Injection of corrosion inhibitor	Injection of corrosion inhibitor
	Crack injection	
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	
	Does your agency have established inspection procedures specific to PT bridges?	NO
YES, Please provide a link or location where procedure can be accessed:		

TEXAS

<p>Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.</p>	Visual methods	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
<p>Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.</p>	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	PTI Level 1 installer
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
<p>Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.</p>	Open-Ended Response	In accordance with PTI and ASBI
<p>Does your agency have grout storage requirements?</p>	NO	
	YES, Please specify guiding document, provide link, or describe:	Yes, per manufacturers recommendations. Considering adding a requirement for contractor to submit life cycle tracking of grout.

TEXAS	
Who conducts QA? Please check all that apply.	Contractor Contractor
	In-house In-house
	Consultant inspection (CEI) Consultant inspection (CEI)
	Other, please specify:
Who conducts QC? Please check all that apply.	Contractor
	In-house
	Consultant inspection (CEI) Consultant inspection (CEI)
	Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	
	Open-Ended Response
Have you encountered problematic PT construction details?	YES
	NO NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details
	Mid-tendon vents
	Inspection ports
	Duct placement
	Duct splicing
	Heat-shrink sleeves
	Confinement reinforcement
	Segment mating during erection
	Match-cast joints
	Precast quality
	Deck drainage details
	Other. Please describe:
Have you encountered problematic construction techniques/methods?	YES
	NO NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test
	Vacuum test
	Deck-level vent removal/permanent vent cap placement
	Permanent grout cap placement
	Grouting/filler procedures
	Vacuum grouting
	Preparing anchorage area for block-out pour
	Other. Please specify.

TEXAS

Have you found encountered issues with any of the materials used in PT construction?	YES	YES
	NO	
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	Prestressing steel
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	Pour-back materials
Other, please specify:		
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	Secondary/Transverse PT corrosion damaged failure
How have you rectified these issues?	Open-Ended Response	Restrained by means other than PT
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	YES, please contact me.

UTAH

Name(s)	
Title(s)	Structures Design Manager
Agency	Utah Department of Transportation
State/Province	UT
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 100
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2017
What were the reference documents used for updating? Please specify/explain:	See UDOT Standard Specification 03251 Section 1.3 for a list of reference documents that were used.
What PT specifications are you using? Please check all that apply.	Open-Ended Response
	ASBI/PTI M50 ASBI/PTI M50
	PTI M55 PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
Are your PT specifications very similar to or derived from another state's?	Other, please provide a link:
	NO
What type of PT structures are in your inventory? Please check all that apply.	YES, Please specify source:
	Cast-in-place segmental Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges
	Box girders
	Pier caps Pier caps
	Spliced girder Spliced girder
	Other

UTAH

Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	commercial, prepackaged, anti-bleed, post tensioning grout conforming to the requirements for Class C grout as defined by PTI M55.1
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	NO
	YES	
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	

UTAH

Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	Not that I am aware of, but we have widened bridges with PT decks.
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	
	During construction	
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	
	Invasive inspection of PT system	
	Repair of pour-back (anchor block-out)	
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
Other. Please specify:		
Does your agency have established inspection procedures specific to PT bridges?	NO	NO
	YES, Please provide a link or location where procedure can be accessed:	

UTAH

<p>Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.</p>	Visual methods	
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
<p>Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.</p>	ASBI grouting certification	
	PTI Level 1 installer	
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
<p>Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.</p>	<p>Open-Ended Response</p> <p>See UDOT Specification 03251 https://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:4867,</p>	

UTAH

Does your agency have grout storage requirements?	NO	
	YES, Please specify guiding document, provide link, or describe:	Deliver grout in plastic lined or coated moisture proof containers, stamped with the applicatino type, date of manufacture, lot number. Use within 6 months of manufacture.
Who conducts QA? Please check all that apply.	Contractor	Contractor
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.		
	Open-Ended Response	NA
Have you encountered problematic PT construction details?	YES	
	NO	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO

UTAH

Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	
	NO	NO
Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?		
	Open-Ended Response	NA
How have you rectified these issues?		
	Open-Ended Response	NA
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):		
	Open-Ended Response	NA

VERMONT

Name(s)	
Title(s)	
Agency	
State/Province	VT
Email Address(es)	
Phone Number(s)	

INTERVIEW QUESTIONS

Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 150
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 07/01/2010
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response AASHTO LRFD code, and PCI
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO
	YES, Please specify source: NYSDOT
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges PT slab bridges
	Box girders Box girders
	Pier caps
	Spliced girder Spliced girder
	Other

VERMONT

Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	75
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	Proprietary, submittals must go through the approved products group.
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	
	Precast segmental	
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	
Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	

VERMONT

Has your agency encountered issues requiring repair related to corrosion?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO	NO
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	NO
	YES, Please describe issue and performed repair:	
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	
	During construction	
	At a later stage when structure in-service	
	NDT-aided inspection of PT system	
	Invasive inspection of PT system	
	Repair of pour-back (anchor block-out)	
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
Other. Please specify:		
Does your agency have established inspection procedures specific to PT bridges?	NO	NO
	YES, Please provide a link or location where procedure can be accessed:	

VERMONT

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	PTI Level 2 installer
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<div></div>	
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	
Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	

VERMONT

Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	
	NO	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
	Other. Please describe:	
Have you encountered problematic construction techniques/methods?	YES	
	NO	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	
	NO	NO

VERMONT

Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
Other, please specify:		
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	None
How have you rectified these issues?	Open-Ended Response	N/A
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	NO
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	

WASHINGTON	
Name(s)	
Title(s)	State Bridge Engineer
Agency	Washington State DOT
State/Province	WA
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 180
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2015
What were the reference documents used for updating? Please specify/explain:	Open-Ended Response ASBI/PTI
What PT specifications are you using? Please check all that apply.	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications In-house/DOT created specifications
	Other, please provide a link:
Are your PT specifications very similar to or derived from another state's?	NO NO
	YES, Please specify source:
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental Cast-in-place segmental
	Precast segmental Precast segmental
	Cast-in-place, non-segmental Cast-in-place, non-segmental
	PT decks PT decks
	PT slab bridges PT slab bridges
	Box girders Box girders
	Pier caps Pier caps
	Spliced girder Spliced girder
Other	

WASHINGTON

Are your PT structures designed for a specific service life?	NO	NO
	YES, What is the design service life (number of years)?	
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO	NO
	YES	
	YES, What is the level specified?	
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response	pre-bagged, proprietary non-segregating (like SikaGrout 300 PT)
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO	
	YES	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	
	Cast-in-place, non-segmental	Cast-in-place, non-segmental
	PT decks	
	PT slab bridges	
	Box girders	
	Pier caps	
	Spliced girder	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO	NO
	YES, Please provide a link:	
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO	NO
	YES, Please provide a link:	
Who performs repairs? Please check all that apply.	In-house staff	
	Contractor	Contractor
	Other. Please describe:	

WASHINGTON

Has your agency encountered issues requiring repair during construction?	NO	
	YES, Please describe issue and performed repair:	Poorly-grouted tendons requiring vacuum grouting to fill voids in the ducts.
Has your agency encountered issues requiring repair related to corrosion?	NO NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO NO	
	YES, Please describe issue and performed repair:	
Has your agency performed repair/replacement of decks on PT bridges?	NO	
	YES, Please describe issue and performed repair:	Bridge deck overlays on PT box girder bridges. The original deck is left in place with limited repair.
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage	
	Re-grouting of tendons	
	During construction	During construction
	At a later stage when structure in-service	At a later stage when structure in-service
	NDT-aided inspection of PT system	
	Invasive inspection of PT system	
	Repair of pour-back (anchor block-out)	
	FRP wrapping	
	Injection of corrosion inhibitor	
	Crack injection	
	Repair or replacement of deck on a PT superstructure	
	Internal/bonded tendon replacement	
	External/unbonded tendon replacement	
	Other. Please specify:	
	Does your agency have established inspection procedures specific to PT bridges?	NO NO
YES, Please provide a link or location where procedure can be accessed:		

WASHINGTON

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods	
	Magnetic methods (i.e., magnetic flux leakage)	
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)	
	Radiation methods (i.e., x-ray diffraction, radiography)	
	Electrochemical techniques (i.e., half-cell potential)	
	Other, or not sure how to classify. Please describe:	
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification	ASBI grouting certification
	PTI Level 1 installer	
	PTI Level 2 installer	
	Other, please describe:	
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Verification of tendon profiles, stressing elongation checks, pre-grouting pressure test of the tendons, verification of grout properties.	
Does your agency have grout storage requirements?	NO	NO
	YES, Please specify guiding document, provide link, or describe:	
Who conducts QA? Please check all that apply.	Contractor	
	In-house	In-house
	Consultant inspection (CEI)	Consultant inspection (CEI)
	Other, please specify:	

WASHINGTON

Who conducts QC? Please check all that apply.	Contractor	Contractor
	In-house	
	Consultant inspection (CEI)	
	Other, please specify:	
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	Open-Ended Response	
Have you encountered problematic PT construction details?	YES	
	NO	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details	
	Mid-tendon vents	
	Inspection ports	
	Duct placement	
	Duct splicing	
	Heat-shrink sleeves	
	Confinement reinforcement	
	Segment mating during erection	
	Match-cast joints	
	Precast quality	
	Deck drainage details	
Other. Please describe:		
Have you encountered problematic construction techniques/methods?	YES	YES
	NO	
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test	
	Vacuum test	
	Deck-level vent removal/permanent vent cap placement	
	Permanent grout cap placement	
	Grouting/filler procedures	Grouting/filler procedures
	Vacuum grouting	
	Preparing anchorage area for block-out pour	
	Other. Please specify.	
Have you found encountered issues with any of the materials used in PT construction?	YES	
	NO	NO

WASHINGTON

Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	<div>Open-Ended Response</div> <div>None.</div>	
How have you rectified these issues?	<div>Open-Ended Response</div>	
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	<div>NO</div> <div>NO</div>	
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	<div>Open-Ended Response</div>	

WISCONSIN	
Name(s)	
Title(s)	Structural Development Engineer
Agency	WisDOT
State/Province	WI
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	YES, please specify approximate quantity: 6
Why not? Please check all that apply.	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Time consuming design/construction
	Other, Please describe:
When were your PT Specifications last updated (approximately)?	Date 01/01/2015
What were the reference documents used for updating? Please specify/explain:	<p>For Integral Pier Caps: -AASHTO LRFD Bridge Design Spec - AASHTO LRFD Construction Spec -1999 AASHTO Guide Spec for Design and Construction of Segmental Concrete Bridges For Wall Tiebacks: - AASHTO LRFD Bridge Design Spec - AASHTO LRFD Construction Spec - "Guide Specification for Post-Tensioning Materials, "Post-Tensioning Manual, Post Tensioning Institute. - "Specification for Unbonded Single Strand Tendons, "Post-Tensioning Institute. - "Recommendations for Prestressed Rock and Soil Anchors,"Post-Tensioning.</p> <p>Open-Ended Response</p>

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What PT specifications are you using? Please check all that apply.	ASBI/PTI M50	
	PTI M55	
	In-house/DOT created specifications	In-house/DOT created specifications
	Other, please provide a link:	
Are your PT specifications very similar to or derived from another state's?	NO	
	YES, Please specify source:	
What type of PT structures are in your inventory? Please check all that apply.	Cast-in-place segmental	Cast-in-place segmental
	Precast segmental	Precast segmental
	Cast-in-place, non-segmental	
	PT decks	
	PT slab bridges	PT slab bridges
	Box girders	Box girders
	Pier caps	Pier caps
	Spliced girder	
	Other	Retaining wall tiebacks for soldier piles walls and sheet pile walls with anchors
Are your PT structures designed for a specific service life?	NO	
	YES, What is the design service life (number of years)?	75

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Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO
	YES
	<p>WisDOT specifications do not call out a specific protection level, however Integral Pier Caps and Anchored Retaining Wall Systems are generally PL-2 (Engineered grout, permanent grout cap, and an enclosed envelope for a permanent leak-light barrier). For adjacent box girders PT transversely, they are either PL1A or PL1B, depending on the grout used. Engineered premixed grouts are often used with permanent grout caps.</p> <p>YES, What is the level specified?</p>
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	<p>For PT pier caps: Grouts shall be prebagged in plastic lined or coated bags, proprietary. For adjacent box girders PT transversely: Use a grout composition of 94 pounds of Type 1 cement, 5 gallons of water and 1 pound of approved plasticizer or a pre-mixed packaged non-shrink grout</p> <p>Open-Ended Response</p>
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO
	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	Other
	NO
	YES, Please provide a link:

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Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO YES, Please provide a link:
Who performs repairs? Please check all that apply.	In-house staff Contractor Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO YES, Please describe issue and performed repair:
Has your agency encountered issues requiring repair related to corrosion?	NO YES, Please describe issue and performed repair:
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO YES, Please describe issue and performed repair:
Has your agency performed repair/replacement of decks on PT bridges?	NO YES, Please describe issue and performed repair:
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage Re-grouting of tendons During construction At a later stage when structure in-service NDT-aided inspection of PT system Invasive inspection of PT system Repair of pour-back (anchor block-out) FRP wrapping Injection of corrosion inhibitor Crack injection Repair or replacement of deck on a PT superstructure Internal/bonded tendon replacement External/unbonded tendon replacement Other. Please specify:

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Does your agency have established inspection procedures specific to PT bridges?	<div>NO</div> <div>NO</div> <div>YES, Please provide a link or location where procedure can be accessed:</div>
Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)
	Radiation methods (i.e., x-ray diffraction, radiography)
	Electrochemical techniques (i.e., half-cell potential)
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification
	PTI Level 1 installer
	PTI Level 2 installer
	Other, please describe:
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	<div></div> <div>Open-Ended Response</div>
Does your agency have grout storage requirements?	<div>NO</div> <div>YES, Please specify guiding document, provide link, or describe:</div>
Who conducts QA? Please check all that apply.	Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:

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Who conducts QC? Please check all that apply.	Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:
Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.	
	Open-Ended Response
Have you encountered problematic PT construction details?	YES
	NO
Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.	Anchorage pour-back details
	Mid-tendon vents
	Inspection ports
	Duct placement
	Duct splicing
	Heat-shrink sleeves
	Confinement reinforcement
	Segment mating during erection
	Match-cast joints
	Precast quality
	Deck drainage details
	Other. Please describe:
Have you encountered problematic construction techniques/methods?	YES
	NO
Please identify construction methods that are problematic. Please check all that apply.	Air (pressure) test
	Vacuum test
	Deck-level vent removal/permanent vent cap placement
	Permanent grout cap placement
	Grouting/filler procedures
	Vacuum grouting
	Preparing anchorage area for block-out pour
	Other. Please specify.
Have you found encountered issues with any of the materials used in PT construction?	YES
	NO

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Please identify materials which have been problematic. Please check all that apply.	Grout filler material	
	Flexible filler material (non-cementitious, wax, grease, etc.)	
	Prestressing steel	
	Elastomeric coatings	
	Epoxy grouts	
	Pour-back materials	
	Other, please specify:	
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	Open-Ended Response	
How have you rectified these issues?	Open-Ended Response	
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO	
	YES, Please describe how it was performed:	
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	Open-Ended Response	I'm not aware of any PT repair cases.

WYOMING	
Name(s)	
Title(s)	
Agency	
State/Province	WY
Email Address(es)	
Phone Number(s)	
INTERVIEW QUESTIONS	
Does your agency have post-tensioned (PT) structures in its bridge inventory?	NO
	NO
Why not? Please check all that apply.	YES, please specify approximate quantity:
	Lack of familiarity with post-tensioned structures
	Concerns related to quality/durability
	Expense
	Expense
When were your PT Specifications last updated (approximately)?	Time consuming design/construction
	Other, Please describe:
What were the reference documents used for updating? Please specify/explain:	
What PT specifications are you using? Please check all that apply.	Open-Ended Response
	ASBI/PTI M50
	PTI M55
	In-house/DOT created specifications
Are your PT specifications very similar to or derived from another state's?	Other, please provide a link:
	NO
What type of PT structures are in your inventory? Please check all that apply.	YES, Please specify source:
	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
Spliced girder	
	Other

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Are your PT structures designed for a specific service life?	NO
	YES, What is the design service life (number of years)?
Do you specify a protection level (PL-1a or PL-1b, PL-2, PL-3 as specified in ASBI/PTI M50) for your PT structures?	NO
	YES
	YES, What is the level specified?
What type of PT grout do you specify for initial construction (i.e., "pre-bagged, proprietary", "cement/water")? Please describe:	Open-Ended Response
Has your agency initiated repairs on any post-tensioned structures (either during construction or while the structure is in service)?	NO
	YES
On what types of PT structures have you performed repairs? Please check all that apply.	Cast-in-place segmental
	Precast segmental
	Cast-in-place, non-segmental
	PT decks
	PT slab bridges
	Box girders
	Pier caps
	Spliced girder
	Other
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT tendon replacement specifically?	NO
	YES, Please provide a link:
Does your agency have standard or commonly-used plans, specifications, procedures or details for PT repairs?	NO
	YES, Please provide a link:

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Who performs repairs? Please check all that apply.	In-house staff
	Contractor
	Other. Please describe:
Has your agency encountered issues requiring repair during construction?	NO
	YES, Please describe issue and performed repair:
Has your agency encountered issues requiring repair related to corrosion?	NO
	YES, Please describe issue and performed repair:
Has your agency performed repairs to PT structures due to damage by vessel/vehicle impact?	NO
	YES, Please describe issue and performed repair:
Has your agency performed repair/replacement of decks on PT bridges?	NO
	YES, Please describe issue and performed repair:
Have your agency performed (or initiated) the following types of maintenance, inspection or repairs related to PT structures? Please check all that apply.	Member strengthening to address corrosion/impact damage
	Re-grouting of tendons
	During construction
	At a later stage when structure in-service
	NDT-aided inspection of PT system
	Invasive inspection of PT system
	Repair of pour-back (anchor block-out)
	FRP wrapping
	Injection of corrosion inhibitor
	Crack injection
	Repair or replacement of deck on a PT superstructure
	Internal/bonded tendon replacement
	External/unbonded tendon replacement
	Other. Please specify:
Does your agency have established inspection procedures specific to PT bridges?	NO
	YES, Please provide a link or location where procedure can be accessed:

WYOMING

Have you used any NDT methods for evaluating the post-tensioning system? Please check all that apply, including if used in a research effort.	Visual methods
	Magnetic methods (i.e., magnetic flux leakage)
	Mechanical wave propagation and vibration methods (i.e., acoustic emission, impact echo, ultrasonic)
	Electromagnetic wave propagation (i.e., infrared thermography, impulse radar, ground penetrating radar)
	Direct measurement of tendon force (i.e. gages on strands)
	Radiation methods (i.e., x-ray diffraction, radiography)
	Electrochemical techniques (i.e., half-cell potential)
	Other, or not sure how to classify. Please describe:
Please select install certifications/qualifications required by your agency for PT installers. Please check all that apply.	ASBI grouting certification
	PTI Level 1 installer
	PTI Level 2 installer
	Other, please describe:
Please describe your QA/QC procedures during construction. For example, inspections prior to casting, stressing elongation checks, pre-duct fill pressure/vacuum checks, post-duct fill grout quality checks, certification of (e.g. ASBI-certified) PT inspectors, mud balance, or flow meter? Please provide a link, if possible.	Open-Ended Response
Does your agency have grout storage requirements?	NO
Who conducts QA? Please check all that apply.	YES, Please specify guiding document, provide link, or describe:
	Contractor
	In-house
	Consultant inspection (CEI)
Who conducts QC? Please check all that apply.	Other, please specify:
	Contractor
	In-house
	Consultant inspection (CEI)
	Other, please specify:

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Please identify any preferred or “best practice” construction details. (Details which perform as intended and are worthy of note.) Please provide a link, if possible.

Open-Ended Response

Have you encountered problematic PT construction details?

YES

NO

Please identify construction details that are problematic. Check all that apply, to the best of your knowledge.

Anchorage pour-back details

Mid-tendon vents

Inspection ports

Duct placement

Duct splicing

Heat-shrink sleeves

Confinement reinforcement

Segment mating during erection

Match-cast joints

Precast quality

Deck drainage details

Other. Please describe:

Have you encountered problematic construction techniques/methods?

YES

NO

Please identify construction methods that are problematic. Please check all that apply.

Air (pressure) test

Vacuum test

Deck-level vent removal/permanent vent cap placement

Permanent grout cap placement

Grouting/filler procedures

Vacuum grouting

Preparing anchorage area for block-out pour

Other. Please specify.

Have you found encountered issues with any of the materials used in PT construction?

YES

NO

WYOMING

Please identify materials which have been problematic. Please check all that apply.	Grout filler material
	Flexible filler material (non-cementitious, wax, grease, etc.)
	Prestressing steel
	Elastomeric coatings
	Epoxy grouts
	Pour-back materials
	Other, please specify:
What specific problems with deterioration of CIP post-tensioned bridges have you encountered?	 Open-Ended Response
How have you rectified these issues?	 Open-Ended Response
Have you replaced a deck on CIP post-tensioned box girder or segmental concrete bridge?	NO
	YES, Please describe how it was performed:
If you know of a particular PT repair for consideration as a case study, please provide some general information (for example: bridge name, location, issue type):	 Open-Ended Response <div style="text-align: right;">NA</div>