

## A Strategic View of SHRP 2 Renewal Research Products

Two concepts are fundamental to SHRP 2:

- Even complex problems will yield to research on many fronts, and
- Full benefits of the research will be realized only when the products are applied in strategic groups.

While SHRP 2 research has four focus areas, the findings will not sort themselves into such tidy categories. The outcomes of the research and their applications will cross the traditional boundaries of function and discipline. This document matches expected products of Renewal research to specific activities of state departments of transportation and related communities to suggest that seeing the full benefits may require a strategic view.

Renewal research in SHRP 2 is the search for tools and techniques that

- speed highway project delivery
- reduce disruptions to traffic, utilities, and neighborhoods, and
- build roads, bridges, and tunnels that last.

The program includes 28 projects that support these goals and is funded at \$32 million over 7 years. The expected products are listed here for implementation planning purposes. Much of the research is just starting and almost all of the products listed here are still in development.

Bold typeface in the lists indicates products of direct relevance to a DOT functional activity, regular type indicates products related to such activities. The lists also provide SHRP 2 project numbers which can be cross-referenced with the Products Chart and project descriptions found on the website at [www.TRB.org/SHRP2](http://www.TRB.org/SHRP2).

**Bridge and Structure Design, Construction, and Preservation**  
*SCOH Subcommittee with Primary Interest: Subcommittee on Bridge and Structures*

| <u>Project Number</u> | <u>Anticipated Products</u>                                  | <u>Investment (\$M)</u> |
|-----------------------|--|-------------------------|
| R02                   | Ground improvement techniques (earthworks)                   | 3.0                     |
| R04                   | <b>Innovative bridge designs</b>                             | <b>2.0</b>              |
| R06                   | NDT/NDE methods for bridges                                  | 3.4                     |
| R07                   | Performance specifications for rapid renewal                 | 3.0                     |
| R09                   | Risk manual for rapid contracts                              | 0.25                    |
| R10                   | Innovative management strategies for large/complex projects  | 1.25                    |
| R15                   | Integrating utility and transportation priorities            | 0.25                    |
| R15-B                 | Solutions for utility conflicts                              | 0.3                     |
| R19-A                 | <b>100-year service life for bridges: systems/components</b> | <b>2.0</b>              |
| R19-B                 | <b>Designing bridges for 100-Year Service</b>                | <b>1.0</b>              |

**Direct Investment: 5.00**  
Related Investment: 11.45  
**TOTAL INVESTMENT: 16.45**

Users and Stakeholders: bridge designers; bridge construction engineers and inspectors; geotechnical and foundation specialists; general and specialty contractors; transportation agencies (state, city, and local); design and construction consultants; maintenance specialists; materials specialists (R19A)

**Construction and Project Management**

*SCOH Subcommittee with Primary Interest: Subcommittee on Construction*

| <u>Project Number</u> | <u>Anticipated Products</u>   | <u>Investment (\$M)</u> |
|-----------------------|---|-------------------------|
| R01                   | Utility location and characterization tools<br>R01 Project Series                     | 5.0                     |
| R02                   | Ground improvement techniques (earthworks)  | 3.0                     |
| R03                   | <b>Methods to reduce worker fatigue on rapid renewal projects</b>                     | <b>1.0</b>              |
| R07                   | <b>Performance specifications for rapid renewal</b>                                   | <b>3.0</b>              |
| R09                   | <b>Risk manual for rapid renewal contracts</b>  | <b>0.25</b>             |
| R10                   | <b>Innovative project management strategies for large/complex projects</b>            | <b>1.25</b>             |
| R11                   | <b>Strategic approaches to corridor and network management to minimize disruption</b> | <b>1.50</b>             |
| R15                   | Techniques for integrating utility and transportation priorities                      | 0.25                    |
| R15-B                 | Solutions for utility conflicts   | 0.30                    |
| R-16                  | <b>Railroad-DOT institutional mitigation strategies</b>                               | <b>0.4</b>              |
| R19-A                 | 100-year service life for bridges: systems/components                                 | 2.0                     |

**Direct Investment: 7.40**  
Related Investment: 10.00  
**TOTAL INVESTMENT: 17.40**

Users and Stakeholders: consultants (design and construction); constructors (general and specialty); transportation agencies (state, city, and local); construction engineers and inspectors; transportation agency middle and upper management; cooperating agencies (R11); stakeholders (R11); traffic management specialists (R10 and R11)

## Geotechnical/ Foundation Design and Construction

*SCOH Subcommittees with Primary Interest: Materials; Bridges and Structures*

| Project Number                 | Anticipated Products  | Investment (\$M) |
|--------------------------------|---|------------------|
| R02                            | <b>Ground improvement techniques (earthworks)</b>           | <b>3.0</b>       |
| R07                            | Performance specifications for rapid renewal                | 3.0              |
| R09                            | Risk manual for rapid renewal contracts                     | 0.25             |
| R10                            | Innovative management strategies for large/complex projects | 1.25             |
| R19-A                          | 100-year service life for bridges: systems/components       | 2.0              |
| R19-B                          | 100-year service life for bridges: service limit state      | 1.0              |
| <b>Direct Investment: 3.0</b>  |   |                  |
| <u>Related Investment: 7.5</u> |   |                  |
| <b>TOTAL INVESTMENT: 10.5</b>  |   |                  |

Users and Stakeholders: geotechnical and foundation specialists (engineers and geologists); transportation agencies (state, city, and local); construction engineers and inspectors; constructors (general and specialty); bridge design, construction, and inspection engineers

## Local Transportation Agencies: Cities, Counties, and Towns

| Project Number                         | Anticipated Products   | Investment (\$M) |
|--|--|------------------|
| R01                                    | Utility location and characterization products<br>R01 Project Series | 5.00             |
| R02                                    | Ground improvement techniques (earthworks)                           | 3.0              |
| R03                                    | Worker fatigue mitigation on rapid renewal projects                  | 1.0              |
| R04                                    | Innovative bridge designs  | 2.0              |
| R05                                    | Modular pavement technology  | 1.0              |
| R06(B-F)                               | NDT/NDE technologies   | 2.25             |
| R07                                    | Performance specifications for rapid renewal                         | 3.0              |
| R09                                    | Risk manual for rapid renewal contracts                              | 0.25             |
| R15                                    | Techniques for integrating utility and transportation priorities     | 0.25             |
| R15-B                                  | Solutions for utility conflicts                                      | 0.3              |
| R-16                                   | Railroad-DOT institutional mitigation strategies                     | 0.4              |
| R19-A                                  | 100-year service life for bridges: systems/components                | 2.0              |
| R23                                    | Achieving long life using existing pavement in place                 | 1.0              |
| R26                                    | Preservation approaches for high traffic roadways                    | 0.25             |
| <b>Total Related Investment: 21.75</b> |  |                  |

## Nondestructive Testing and Evaluation

| Project Number                 | Anticipated Products  | Investment (\$M) |
|--------------------------------|---|------------------|
| R02                            | Ground improvement techniques (earthworks)                          | 3.00             |
| R06                            | <b>Plan for developing NDE/NDT tests</b>                            | <b>0.35</b>      |
| R06A                           | <b>NDT for concrete bridge decks</b>                                | <b>0.75</b>      |
| R06B                           | <b>Field spectroscopy for fingerprinting construction materials</b> | <b>0.40</b>      |
| R06C                           | <b>Infrared and high-speed GPR for new HMA layers</b>               | <b>0.25</b>      |
| R06D                           | <b>NDT for HMA layer delamination</b>                               | <b>0.80</b>      |
| R06E                           | <b>Real-time smoothness test for concrete pavements</b>             | <b>0.55</b>      |
| R06F                           | <b>Continuous pavement deflection device</b>                        | <b>0.25</b>      |
| R06G                           | <b>NDT for tunnel linings</b>                                       | <b>1.65</b>      |
| <b>Direct Investment: 5.0</b>  |   |                  |
| <u>Related Investment: 3.0</u> |   |                  |
| <b>TOTAL INVESTMENT: 8.0</b>   |   |                  |

Users and Stakeholders: NDE/NDT specialists; designers (roadway, pavement, and structure); constructors (general, specialty); materials specialists; geotechnical and foundation specialists (engineers, geologists)

## Pavement Design, Construction, and Preservation

*SCOH Subcommittees with Primary Interest: Design; Joint Technical Committee on Pavements*

| <u>Project Number</u>            | <u>Anticipated Products</u>                                       | <u>Investment (\$M)</u> |
|----------------------------------|---|-------------------------|
| R02                              | Ground improvement techniques (earthworks)                        | 3.0                     |
| R05                              | <b>Modular pavement technology</b>                                | <b>1.0</b>              |
| R06                              | NDT/NDE (except R06A and R06G)                                    | 2.6                     |
| R07                              | Performance specifications for rapid renewal                      | 3.0                     |
| R09                              | Risk manual for rapid renewal contracts                           | 0.25                    |
| R10                              | Innovative PM strategies for large/complex projects               | 1.25                    |
| R15                              | Methods for integrating utility and transportation priorities     | 0.25                    |
| R15-B                            | Solutions for utility conflicts                                   | 0.3                     |
| R21                              | <b>Composite pavement systems</b>                                 | <b>4.0</b>              |
| R23                              | <b>Using existing pavement in place &amp; achieving long life</b> | <b>1.0</b>              |
| R26                              | <b>Preservation approaches for high traffic roadways</b>          | <b>0.25</b>             |
| <b>Direct Investment: 6.25</b>   |   |                         |
| <u>Related Investment: 10.65</u> |   |                         |
| <b>TOTAL INVESTMENT: 16.90</b>   |   |                         |

Users and Stakeholders: consultants (design); pavement designers; materials specialists; pavement specialists (management and preservation); constructors (general and specialty) construction engineers and inspectors

## Utilities

*SCOH Subcommittee with Primary Interest: Right of Way and Utilities*

| <u>Project Number</u>           | <u>Anticipated Products</u>   | <u>Investment (\$M)</u> |
|---------------------------------|---|-------------------------|
| R01                             | <b>Identification of current techniques for locating and characterizing underground utilities; Unmet research needs</b> | <b>0.39</b>             |
| R01-A                           | <b>Technology to store and retrieve 3D utility data</b>   | <b>2.0</b>              |
| R01-B                           | <b>Multisensor technology to locate buried utilities</b>  | <b>2.0</b>              |
| R01-C                           | <b>New tools to find deep utilities</b>   | <b>1.62</b>             |
| R07                             | Performance specifications for rapid renewal  | 3.0                     |
| R09                             | Risk manual for rapid renewal contracts   | 0.25                    |
| R10                             | Innovative management strategies for large/complex projects   | 1.25                    |
| R15                             | <b>Integrating utility and transportation priorities</b>  | <b>0.25</b>             |
| R15-B                           | <b>Solutions for utility conflicts</b>  | <b>0.30</b>             |
| <b>Direct Investment: 5.36</b>  |   |                         |
| <u>Related Investment: 4.50</u> |   |                         |
| <b>TOTAL INVESTMENT: 9.86</b>   |   |                         |

Users and Stakeholders: utility companies, transportation agencies (state, city, and local), utility specialists and coordinators, researchers, consultant design community, project managers, construction engineers, constructors (general and specialty)

Questions about plans for implementing SHRP 2 research products may be sent by email to Jerry DiMaggio at [jdimaggio@nas.edu](mailto:jdimaggio@nas.edu).

**Transportation Research Board of the National Academies  
500 Fifth Street NW Washington, DC 20001  
[www.TRB.org/SHRP2](http://www.TRB.org/SHRP2)**