

Creating a Collaborative Environment between Airport Operations and Maintenance Departments

Executive Summary

Prepared for

ACRP

Transportation Research Board

Of

The National Academies

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Introduction

A Summary of the Problem

The purpose of our research efforts was to deliver a thoughtful, user-friendly guidance manual to help bring about change in airport Operations and Maintenance collaborative practices, improving the efficiency of an airport's critical path to success.

Operations and Maintenance divisions have many overlapping responsibilities, requiring their team members from varying age groups, cultural backgrounds and education/experience to work closely together on a daily basis. The world of work is changing, and airports are facing many challenges and opportunities during this change. The command and control hierarchical airport structure is giving way to new innovative and flexible work structures. Airport organizational structures are flatter, challenging traditional people development models that rely primarily on upward progression. The younger airport generation brings different attitudes to work while older workers are staying in the workforce, perhaps later in life than ever before. This array of economic, demographic and aspirational trends is playing out in unique ways across airports and businesses globally

Our team found that the issue of collaboration in the workplace is a universal subject, the understanding of which is essential to the effectiveness of departments within every industry. Because today's airports are running 24/7, the importance of cross-divisional collaboration is considerably heightened. The Operations and Maintenance divisions must execute tasks around the clock, and because each task has a direct impact on the processes of the other department, it is imperative that the members of each team are able to effectively work together toward common goals.

The research team was tasked with the following problem statement: "Why does there seem to be less collaboration between Operations and Maintenance in comparison to other departments and divisions within airport organizations?"

To further understand the problem, the Research Team carried out the following steps in the research process:

- Conduct an extensive review of relevant literature on airport Operations and Maintenance, including publications, regulatory requirements, organizational behavioral traits and styles, etc.
- Create and distribute online surveys and conduct one-on-one interviews to probe a broad range of attributes of the relationship between Operations, Maintenance and airport leadership, as well as to compare collaboration across airports of differing sizes, management structures and oversight types
- Conduct focus groups to gather information directly from airport teams, allowing them to brainstorm about effective collaborative techniques in practice at their organizations and in turn shed light on particularly helpful guidance
- Through the completion of case studies, gather additional firsthand information and specific scenarios exemplifying successful collaboration in the field

These steps were completed over the course of the research phase of the project, and resulted in capturing extensive data and employee viewpoints on the topic of collaboration. The following results were achieved for each of these categories:

Literature Review

- Over 60 resources were used in the literature review process
- A full list of publications reviewed are included in the Final Report appendices
- Each review was summarized, with key learning from each resource shared with the Research Team to inform the approach on subsequent tasks
- Major findings from the literature review were compared for consistency with those findings of the surveys, interviews, focus groups and case studies and common themes were incorporated in the Guidebook Toolbox

Online Survey and One-on-One Interviews

- 72 unique airports are represented within the online survey and one-on-one interview process
- A total of 50 one-on-one interviews representing 35 airports were conducted with varying levels of airport management
- There were 228 individual respondents through the online survey process
- Through the supplemental analysis process, interview results were captured to a database and were analyzed and compared and contrasted to identify key trends
- Complete online survey and interview summaries are available in the Final Report appendices

Focus Groups

- Focus groups were conducted at five airports
- Individual focus group write-ups are available as part of the Final Report appendices
- Through the supplemental analysis process, focus group results were analyzed and compared and contrasted to online survey and interview results to identify themes and major findings

Case Studies

- Six case studies were conducted
- Case studies were selected based on prior research findings of successful collaboration techniques in use at airports and other travel/hospitality service providers
- Individual case study write-ups are available as part of the Final Report appendices
- Case studies helped address information gaps that were identified during the supplemental data analysis process

The major findings and common themes identified in the literature review, one-on-one Interviews, online survey, focus groups and case studies were applied as the foundation of the Guidebook Toolbox. The findings were used to identify warning signs for organizational traits that work against collaboration,

possible root causes of breakdowns in collaboration and strategies for fostering collaboration, as well as other considerations. The Toolbox focuses on assisting in self-identification of warning signs and barriers, determination of possible root causes, and identification of strategies and tactics to foster collaboration.

Finally, the research process identified a series of tools that airports can use to supplement the Toolbox strategies. Suggested methods for analysis of an airport's collaborative "current state" will help airport leadership determine the collaboration strength and need areas within their organization. Then, using Toolbox strategies, the team can target specific areas of weakness identified with a customized set of solutions. Finally, once the activities have been given enough time to make an impact, the airport can re-administer the assessment to determine their progress. The tools and resources contained within or referenced from the Toolbox will ensure that the Guidebook provides a user friendly means of improving collaboration between airport Operations and Maintenance teams.

As a product of our research and findings, the Collaboration Toolbox has been created so that airports may identify various warning signs within their organization. By diagnosing these points of conflict and inefficiency, departments can work to understand possible causes of barriers to collaboration. Based on the identified warning signs and possible causes, the Guidebook suggests viable strategies to inspire and instill collaborative practices organizationally through a variety of methods and tactics.

Findings

Key Research Findings

Part I of the Guidebook presents findings, impacts and influences on the collaborative environment. The findings from the one-on-one interviews, online survey, focus groups, and case studies indicate that there are three primary elements in contributing to an overall airport collaborative environment:

- **Effective collaboration is attained through broader participation.** Addressing the state of just one division or department in an airport neglects to understand the entirety of the issue. Instead, a practical approach to fostering collaboration must be utilized. Any and all other agencies that affect the decision making process, such as Federal and State Agencies, Airlines and other tenants, must also be considered in the effort.
- **Positive work culture**, which empowers employees to feel pride, ownership and responsibility for the airport is a driving force for collaborating. This includes respectful relations amongst employees as well as effective communication and many other traits that are addressed throughout the Guidebook and Final Report.
- **An environment of trust**, where all employees are dedicated to the ongoing effort is required to maintain collaboration. This includes policies and procedures that reinforce trust, such as training, personal development, celebrating success and strategies to instill personal accountability in all employees.

Broader Participation

In the truest sense, collaboration is most effective when it not only crosses the boundaries of Operations and Maintenance, but is embraced by both internal and external organizational entities. For example, some of the most successful, collaborative environments studied include centralized Communications Centers which leverage a wide set of shared tools. Beyond the Operations and Maintenance disciplines, a highly collaborative example of shared systems could include internal and external partners such as:

- Airlines
- Air Traffic Control
- Engineering
- Ground Handlers
- TSA

In this example, all entities actively participate in a sharing of data and systems related to:

- Weather Forecasts
- Transponder Data
- Runway Sensor Scans
- CCTV
- Airfield Lighting Status
- Emergency Response

- Vehicle Tracking

In this type of collaborative environment, there are efficiencies realized in use of shared resources (for instance, the TSA might be contributing dollars towards CCTV systems) and communication advances in the form of each diverse entity working off the same set of assumptions. Physical proximity and accessibility helps drive timely communication and ease of sharing.

Positive Work Culture

Individual behavior is often largely determined by one's surrounding influences. An easy conclusion is that a positive work culture helps to encourage better overall performance by employees. Several attributes of culture need to be understood in the context of creating a collaborative environment, such as:

- Culture must be understood and fostered for continued success of an organization
- Culture provides the norms for how people are to behave
- Change will come through the culture or the culture must change to embrace it
- Culture becomes an organization's memory

Equally important for airport managers is identifying and understanding cultural differences within their organization. The existence of as many as five generational groupings (Traditionals, Baby Boomers, Generation Xers, Generation Yers and Linksters) makes age differences a high potential for cultural conflict. Individuals from different backgrounds bring with them a culture that presumably can't be easily changed, only understood and accommodated.

Trust

Trust is a consistent, recurring theme within all of our research findings. From focus group respondents to all levels of interviews and online survey responses, trust is a central key to successful collaboration.

"We are both striving to do the same thing, and that is to provide the customer with the safest, quickest and best experience as he passes through our airport. The ONLY thing hindering this is the trust factor, and the feeling of being superior from one department over the other." - **Online Survey Respondent**

Trust within an organization is not a mere byproduct of a successful work culture, and it is more than just a soft skill. Top leaders and high performing organizations all show a high component of trust evident within their respective work groups. Rebuilding from a situation that involves a lack of trust can be addressed over time with a specific focus.

Other Key Factors

In addition to the three key factors in establishing and maintaining collaboration, the following were identified as very significant within our research:

- Impacts of Technology
- Training and Team Building
- Performance Under Pressure

- Aligned Incentives and Common Goals
- Open Communication
- Recognition and Team Building Programs
- Shared Vision and Common Goals
- Budgetary Support
- Consistent Operating Principles with Team Buy-in
- Bonds Strengthened by Crisis

Impacts and Influences on Collaboration

The Research Team found that there were other characteristics of airports that can have impacts on the ability to collaborate and ease of collaboration:

- Airport Structure
- Airport Size
- Organizational Structure
- Team Composition
 - Age/Generational Differences
 - Gender Differences
 - Educational Differences

Detailed discussion of the major findings, other key factors, and impacts and influences are presented in the Guidebook and Final Report, and form the basis of the Toolbox strategies.

The Collaboration Toolbox

Part II of the Guidebook, The Collaboration Toolbox, has been created so that airports may easily identify various warning signs within their organization. Through a process of self-assessment, airport teams are guided to conduct an analysis of points of conflict and inefficiency. Leadership can then work to understand possible causes of barriers to collaboration. Based on the identified warning signs and possible causes, this Toolbox provides viable strategies to inspire and instill collaborative practices organizationally through a variety of methods and tactics, including assessment tools and activities for inspiring collaboration and team building.

An effort to improve collaboration between Operations and Maintenance teams should begin with an evaluation of the “current state” of collaboration across the two functional areas. This allows airport leadership to identify and further understand areas where improvement is needed. The evaluation can be performed through administration of a survey, through hosting of one or more focus groups, or through conducting cross-functional meetings. The Toolbox provides guidance on how to employ each of these methods.

While Chapter 1: Collaboration Assessment Tools provides direction for a foundational effort to assess a current state, Chapter 2: Using the Collaboration Toolbox provides a recommended process for building an improvement plan.

Regardless of the method used for current state assessment, the goal is to gain accurate information about how collaboration is perceived at various levels in the organization, what warning signs are evident that indicate barriers to collaboration, and finally, determination of metrics that can be applied to measure improvements. By diagnosing points of conflict and inefficiency, the departments can work to understand possible root causes of barriers to collaboration. Based on the identified warning signs and possible causes, the Collaboration Toolbox provides actionable strategies that can be leveraged by the team.

The following process is recommended for optimal utilization of the Collaboration Toolbox:

- Complete an assessment survey to assist in identifying warning signs as defined by the surveyed Operations and Maintenance personnel. This survey will provide insight into the overall state of collaboration from the viewpoint of all levels of the team, from frontline employees through senior leadership. Instructions for creating a survey, recommended questions, and interpreting survey results are addressed in an example below as well as in Appendix B.
- Read Chapter III of the Collaboration Toolbox and identify Warning Signs that based on your assessment results are apparent in your organization.
- Refer to the mapping of Warning Signs in Chapter III to specific Possible Causes in Chapter IV. Chapter IV contains descriptions of common barriers to collaboration in and between Operations and Maintenance. Identify which of these Possible Causes are consistent with issues you or others have witnessed within your organization.
- Following analysis of Warning Signs and Possible Causes, along with the findings from the current state assessment, use the Collaboration Toolbox to identify pertinent Strategies for Fostering Collaboration. Each Possible Cause is mapped to one or more Strategies identified in Chapter V.
- Read the recommended Strategies and implement where possible. Keep in mind that each situation is different, and it may be appropriate to leverage only certain activities within one Strategy or parts of multiple Strategies to successfully reduce or eliminate barriers to collaboration.
- Complete a follow on assessment to gain insight to the impacts of the Strategies selected and improvements that have been realized in interdepartmental collaboration. Identify the next level of priorities to address, or, if the initial effort was ineffective, determine additional Possible Causes and appropriate Strategies to implement.

Alternatively, focus groups or cross-functional meetings can be held to identify the current state of collaboration and areas of improvement needed. When the survey approach is not used, teams are encouraged to identify areas where metrics can be identified for measurement purposes. If this approach is taken in lieu of administering a survey, the steps outlined above are otherwise the same. Ensure that the follow on assessment is completed in a consistent manner with the first assessment process such that the results can be accurately measured.

Collaboration Toolbox Scenario

The following scenario has been created to demonstrate an example of the Collaboration Toolbox in use:

For the sake of this demonstration, let's assume that Airport ABC administered an online survey and in the post-survey analysis identified delegation of tasks as a potential area of focus. The Maintenance Supervisor has noticed that some of the Maintenance group are exhibiting "if you want it done right, do it yourself" attitudes, which has resulted in animosity between certain team members, process slowdowns, and excessive workloads for certain members.

Referring to the Collaboration Toolbox, the Maintenance Supervisor narrows this issue down to the Warning Sign of "Employees not comfortable delegating tasks" and finds the following entry:

Employees are not comfortable delegating tasks. Certain employees exhibit a "if you want it done right do it yourself" attitude. This unwillingness to delegate tasks results in process slowdowns and uncompleted tasks, and contributes to silos of skills and knowledge in the organization. *Possible Cause Numbers: 17, 18, 19, 20, 22, 26, 34, 35, 36, 38, and 39.*

The supervisor uses the Toolbox Mapping Worksheet in Appendix D to keep track of the Warning Signs, Possible Causes and Strategies as he goes to help narrow down which to focus on.

Identified Warning Signs	Possible Causes	Strategies for Fostering Collaboration
#11 : Not comfortable delegating tasks	17, 18, 19, 20, 22, 26, 34, 35, 36, 38, 39	6 and 17 - Building Trust and Building Respect

The supervisor then reads each of the Possible Causes that are referenced, and makes a determination as to the most applicable examples. For our example, the supervisor selects Possible Cause Numbers 19, 34 and 36. Each of the three Possible Causes directs the supervisor to specific Strategies for Fostering Collaboration. In this case, the supervisor chooses to focus on Possible Cause 19:

Lack of trust among employees can destroy an organization. This can occur when management maintains too tight a reign on the activities of employees, fails to respect the capabilities of the individual, or has not provided adequate training or selection criteria to assemble a staff that can be trusted to complete tasks properly. *Strategy Numbers 6 and 17*

The Maintenance Supervisor then reviews Strategy Number 6, Building Trust and Strategy Number 17, Building Respect, and chooses to do a survey of employees using the Propensity to Trust tool included in the Building Trust Strategy. This tool helps gauge the current status of trust in the Maintenance department. The results of this short survey reveal that Team Building activities would be beneficial for the Maintenance employees. The supervisor chooses to leverage the Lunar Survival Teambuilding Exercise found in Strategy Number 17, Building Respect:

Tool: Survival Exercise: Lunar Survival Teambuilding Exercise



A Teambuilding Exercise from the Harvard Kennedy School Saguaro Seminar on Civic Engagement in America.

The team completes the exercise and then pursues additional follow on efforts to build teamwork and cross-functional trust. Finally, after a pre-determined period of time, the team re-administers a survey to determine progress, and adjusts priorities accordingly to implement new improvement strategies.

Implement and Measure

The process of engaging with the Collaboration Toolbox is meant to be iterative. The airport teams are encouraged to perform a pre-assessment of the collaborative environment, identify and implement Strategies, and then re-assess the effectiveness of their efforts. By focusing on a few Warning Signs, Possible Causes and Strategies at a time, the Operations and Maintenance teams can bite off manageable activities to address the highest priority issues. As new attitudes and techniques become adopted within the organization, the teams can look to additional Warning Signs and identify new Possible Causes and associated Strategies to implement. Finally, the survey post-assessment can be completed to measure if individual and team attitudes have truly been impacted.

Conclusions

Commonalities of Successful Collaborations

Our research efforts have identified that there are commonalities to be found in airport Operations and Maintenance organizations with successful collaboration. Teams that desire to achieve a more collaborative environment can look to one or more of these commonalities as a foundation off of which to build a collaborative effort:

Open Communication

More than any other single factor, strong and open communication was cited as the key factor in achieving, and perhaps more importantly, maintaining collaboration. Open communication was demonstrated to be achievable in many different ways. Some Operations and Maintenance teams collaborated through advanced tools and technology systems, while others relied on regular (perhaps even daily or weekly) face-to-face status meetings. Some teams combined and shared work space or systems, while others maintained a more separate organizational structure and physical workspace, but were dedicated to a process of keeping all in the loop.

Regardless of the size or organizational structure of the airport, the foundation of successful collaboration was in open and frequent communication.

Recognition and Team Building Programs

The interviews, focus groups and surveys have supported findings from the initial literature review that strong collaboration thrives on positive feedback and recognition. Whether a simple employee barbeque to support team building or a formal awards ceremony and presentation, activities of leadership to promote “esprit de corps” goes a long distance in bridging the natural divides between Operations and Maintenance.

The underlying message is that developing trust in someone implies that you know them or know of them. Recognition programs that promote team building and reward positive performance ultimately increase individual and organizational trust, and encourage collaborative effort.

Shared Vision and Common Goals

A compelling vision of what is important to an airport organization and where that organization is headed is a strong contributor to collaboration. Collaboration requires significant effort. A strong leadership team will understand that the benefits produced by collaboration will be demonstrated in the form of productivity, improved quality, increased job satisfaction and reduced turnover. They will also understand that at the team level, individual work center goals and objectives for Operations and Maintenance may come into conflict with one another. By ensuring that the two groups share common goals and objectives toward a single vision, leadership can help reduce some of the inherent barriers to collaboration.

Budgetary Support

Supporting collaborative efforts and maintaining a collaborative work environment can initially be costly. There are compelling paybacks, but these are generally realized over time, and the initial

investment in technology, systems, and labor costs involved in facilitating collaboration can appear daunting.

Successful airport organizations have shown the willingness to invest in collaboration. The budgetary support can be in the form of improvements such as shared workspace and systems, communications technologies, CMMS, investment in hiring practices, team building events, incentive compensation tied to achievement of goals, and support for weekly or monthly cross functional meetings.

Consistent Operating Principles with Team Buy-in

Operations and Maintenance teams that demonstrate successful collaboration typically share a characteristic of consistency in operating principles. They generally are stable organizations that have mature policies and procedures that are well baked-out and are consistently enforced. They have an experienced and committed workforce that knows what is expected of them and accepts responsibility for their actions.

With buy-in of the team toward organizational success, there follows an openness to mentoring and peer development that is less focused on individual reward and more centered on benefit to the airport organization overall. We see this attitude manifested in expressions that “we take the new guys under our wing.”

Bonds Strengthened by Crisis

Research revealed a consistent theme that bonds between Operations and Maintenance appear stronger when they either have previously faced or consistently face a crisis together. Logically, teams have more motivation to cooperate and collaborate when more is at stake. When teams are working together to either protect lives or battle the elements (or both), there is a fairly instantaneous removal of the day-to-day barriers between the divisions. A dispute over level of respect demonstrated in a radio communication becomes quite insignificant compared to a runway situation which threatens the safety of an aircraft landing.

Recommendations

Through the use of a self-assessment survey tool, identification of opportunity areas, and formation of an actionable implementation plan, the collaboration Toolbox will support airport Operations and Maintenance teams in their efforts to improve cross-department collaboration. Our belief is that a thorough understanding of the Warning Signs, Possible Causes and Strategies to Improve Collaboration will benefit airport teams in a myriad of ways.

The Guidebook is a dynamic tool for all levels of airport employees. It provides a basis on which to identify existing issues in order to initiate and carry out a successful program for fostering collaboration. The intended audience includes airport staff at any level in their organizational hierarchy, both junior and senior. Focus group findings revealed that in some cases executive and senior management were a part of the problem in the organization without realizing so.

The Guidebook is intended to assist in the process of developing collaborative work environments at large, medium and small airports and provides facilitation tools and techniques for airport executives, policymakers, aviation professionals and employees in Operations, Maintenance and Engineering divisions. Strategies for fostering collaboration are targeted for both personal and organizational improvement.

Our Research Team is committed to assisting with the dissemination of our findings and exposing airport industry employees to the tools, processes and procedures that have been identified and developed. We have presented a broad reaching approach to understanding and improving collaboration, and our intent is to leverage extensive relationship networks as well as a wide range of tools to share our research results. We will support dissemination through in-person presentations, webinars, or other forms of communication to support the successful implementation of the methods and tools recommended by the Research Team.

We believe that there is a compelling business case to improving collaboration between airport Operations and Maintenance teams, and encourage use of the Toolbox to remove barriers that are inherent in many of today's airport Operations and Maintenance organizations.