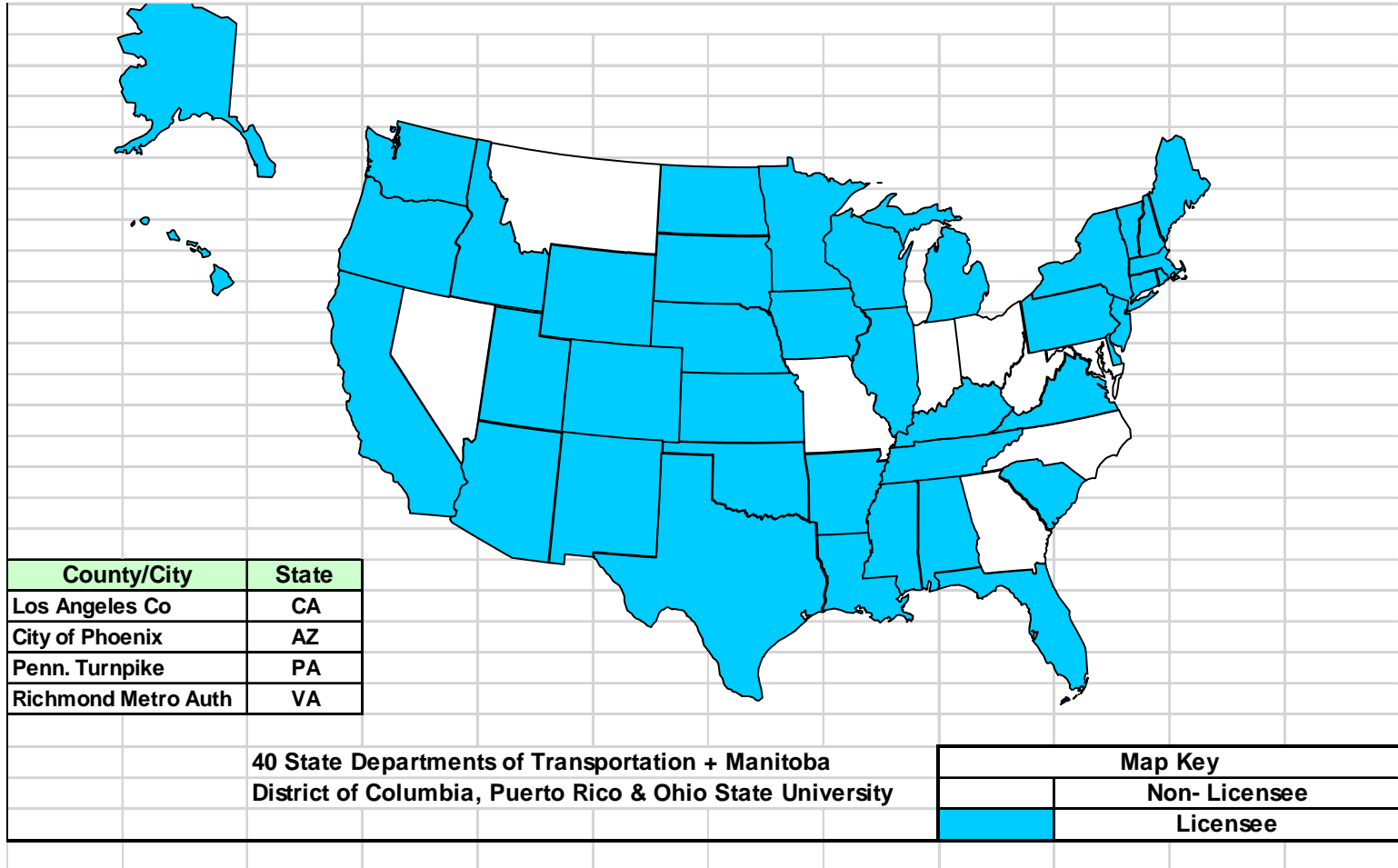




Bridge Management 2018 Administrative Overview

BrMUG Meeting
Santa Fe, NM

FY2017 Licensees





Bridge Management Licensees (FY18)

License Type	Number of Licenses
BrM Site	45
BrM Local/Small Agency	2
BrM Educational	7

New Member Agencies Considering BrM

- Georgia Department of Transportation
- Maryland State Highway Administration
- West Virginia Department of Transportation



Outreach / Marketing

Opportunities to expand the Bridge Management user base.

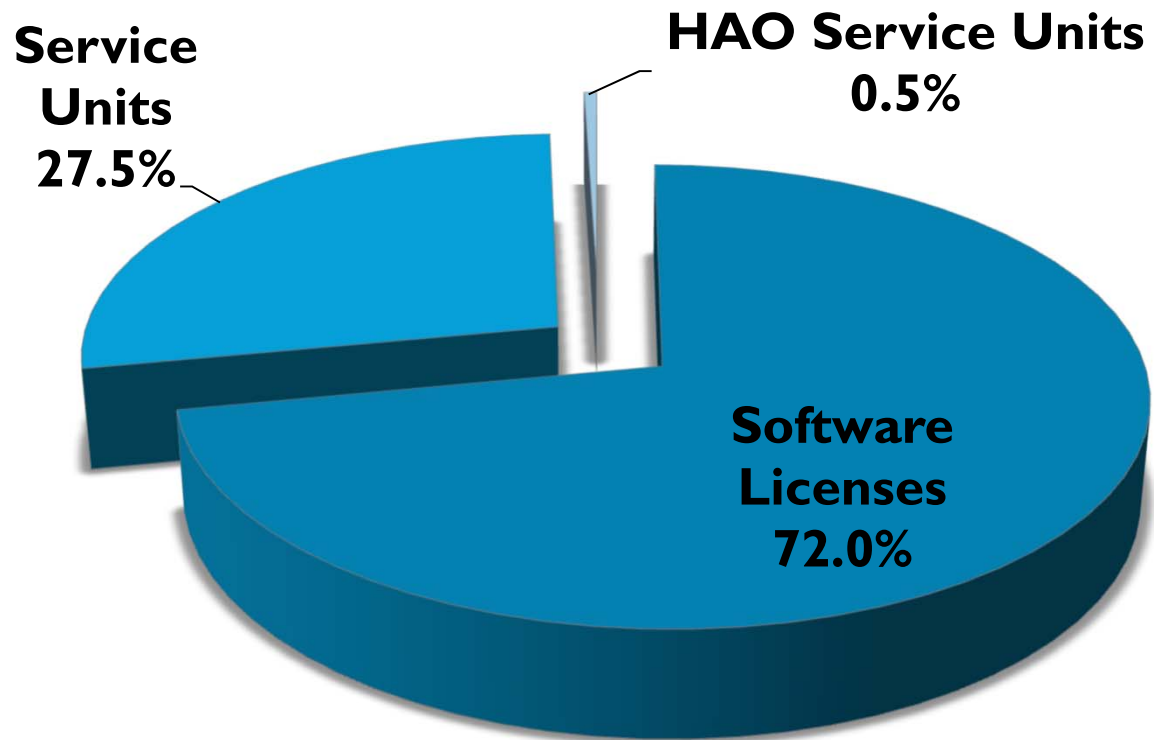
- Use of BrM license by The Kercher Group to support FHWA project HIF180062PR, Bridge Management Systems Workshop.
- Product presentations at numerous meetings and conferences
- Invitations extended to DOT personnel to attend Task Force meetings in their home locales
- Communication tailored for specific audiences



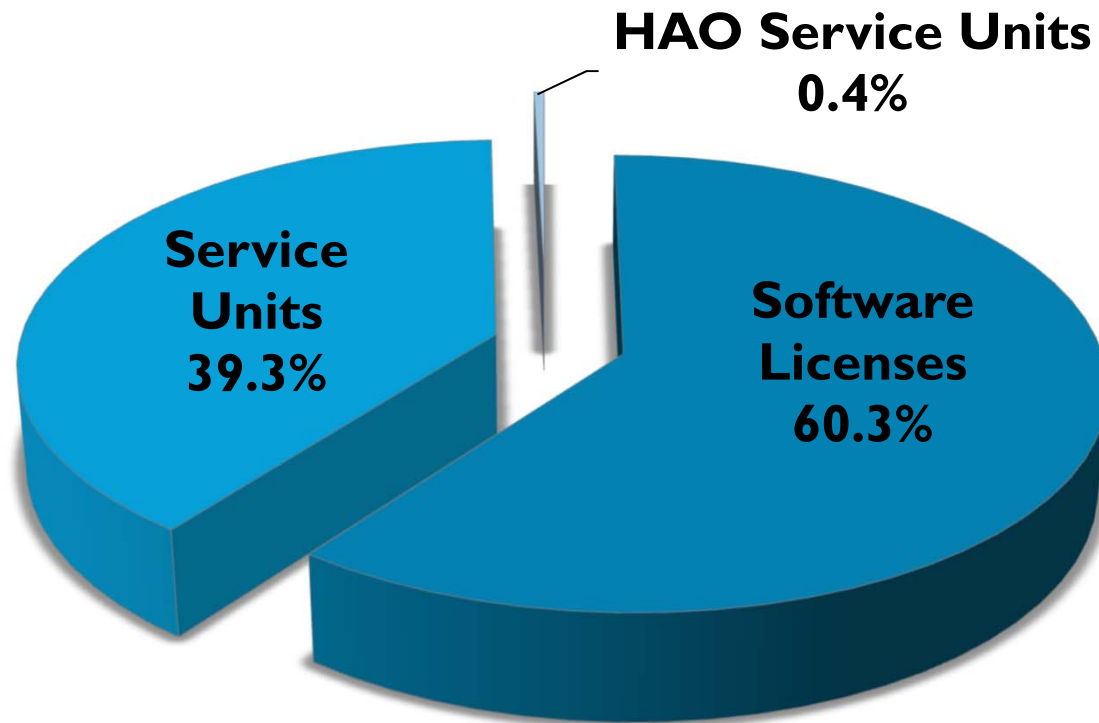
Outreach / Marketing

- Newsletters – hardcopy for conference distribution and online for wider consumption
- AASHTOWare web site (recently updated)
- Incorporation of Ideas / suggestions from the BrM Community
- Enhancements and new features delivered with the release of 6.0
- Quarterly Task Force updates (emailed to the BrM community)

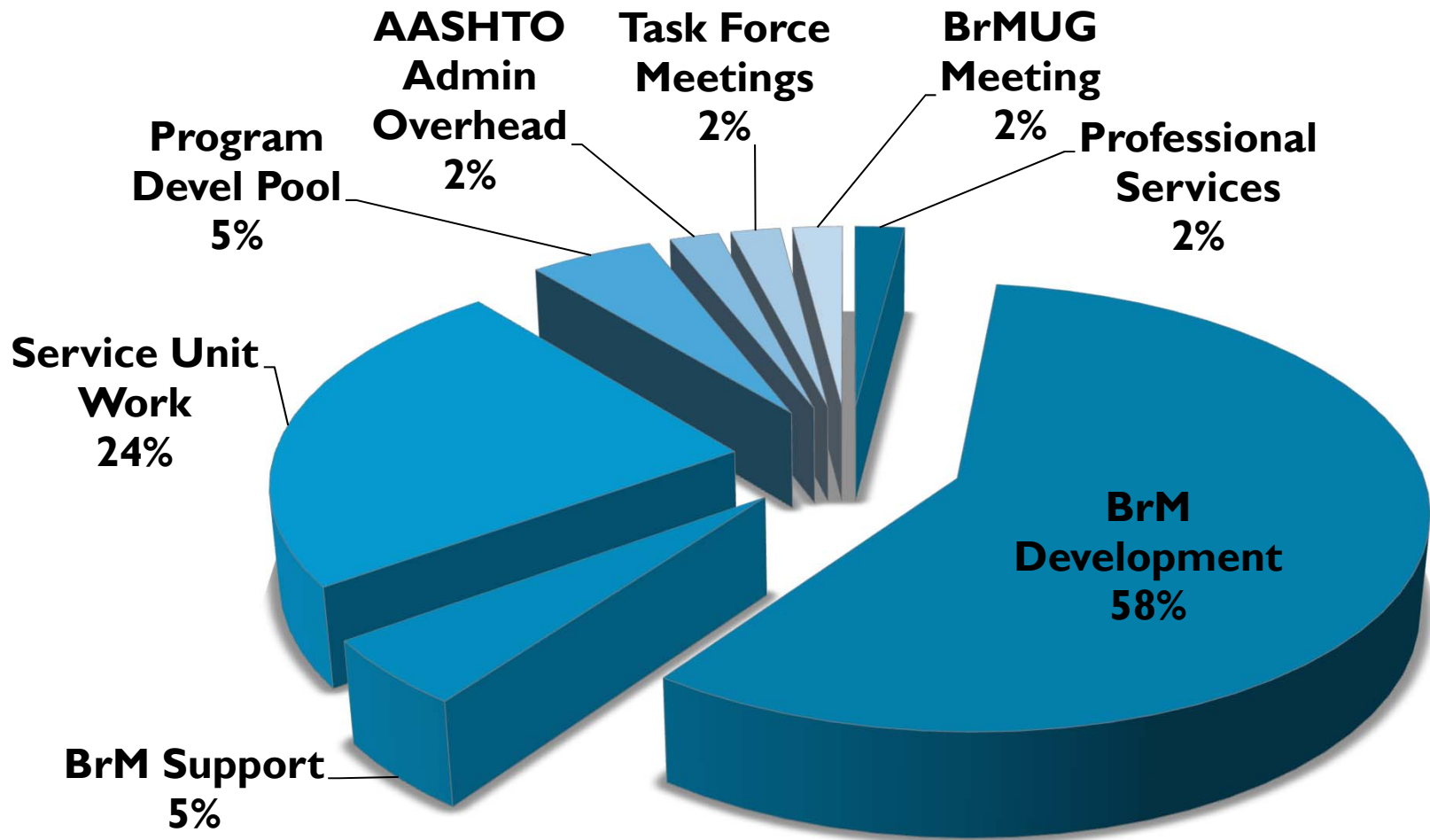
FY2017 Revenue



FY2018 Revenue

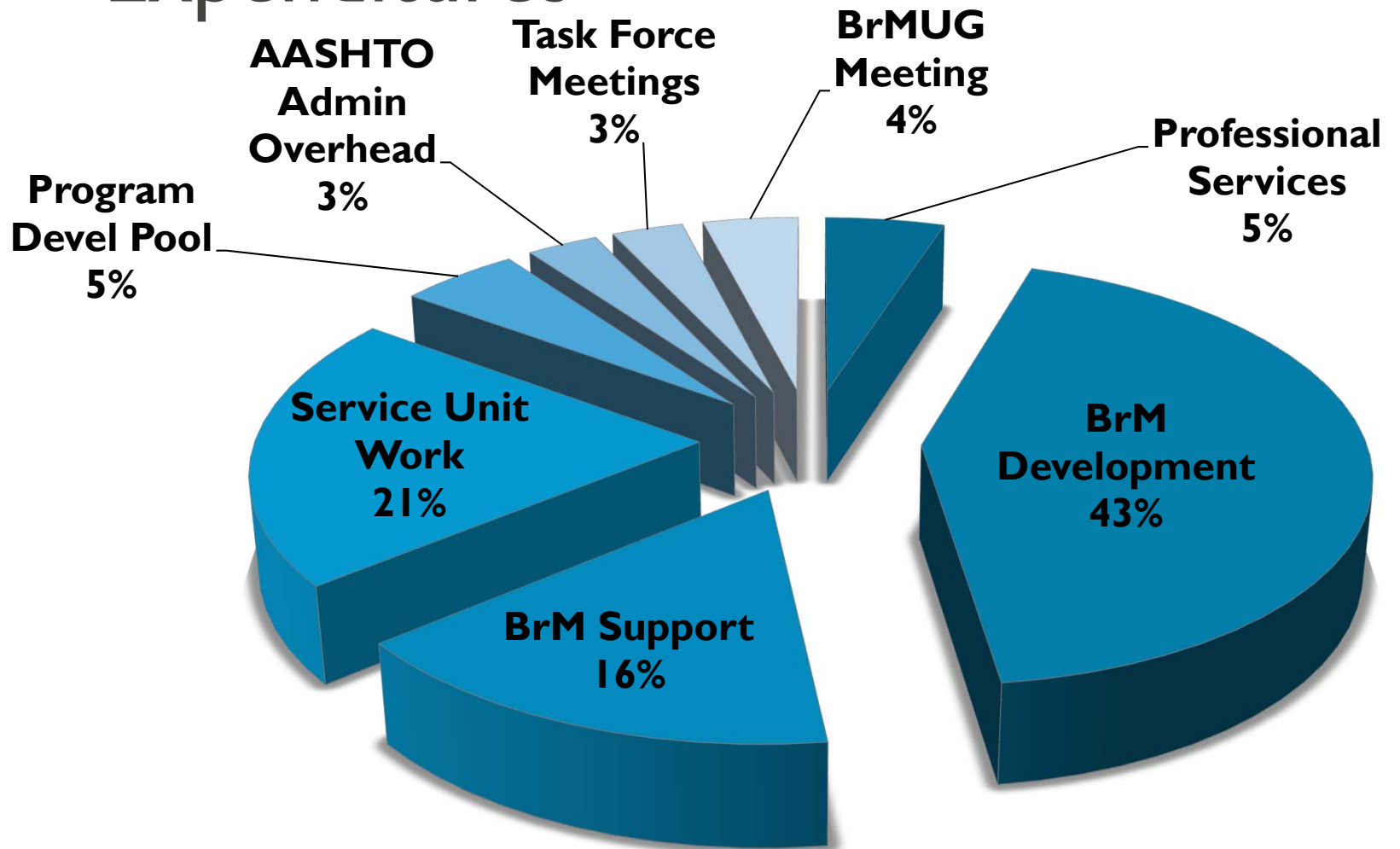


FY2017 Expenditures

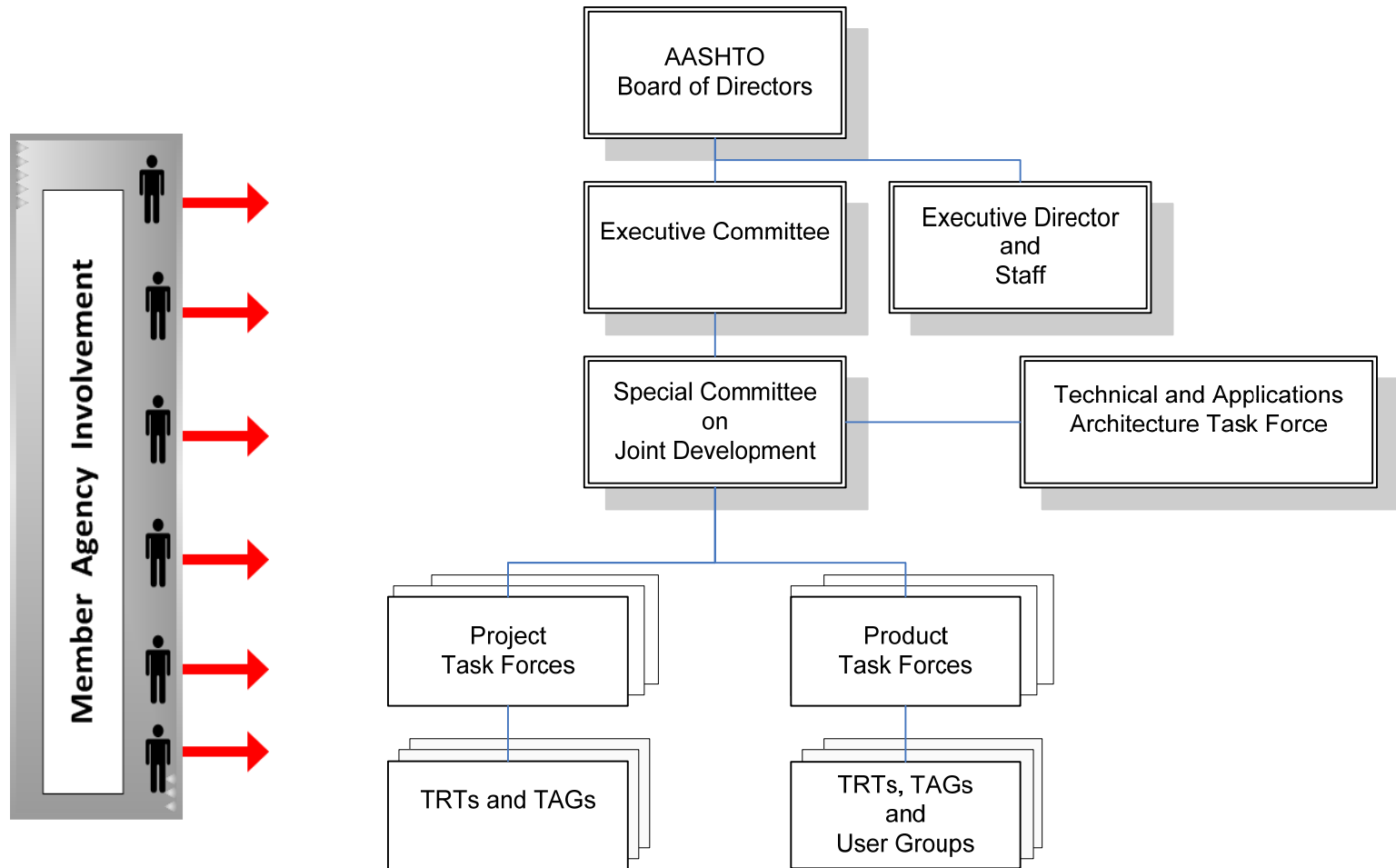


FY2018

Expenditures



AASHTOWare Program Management





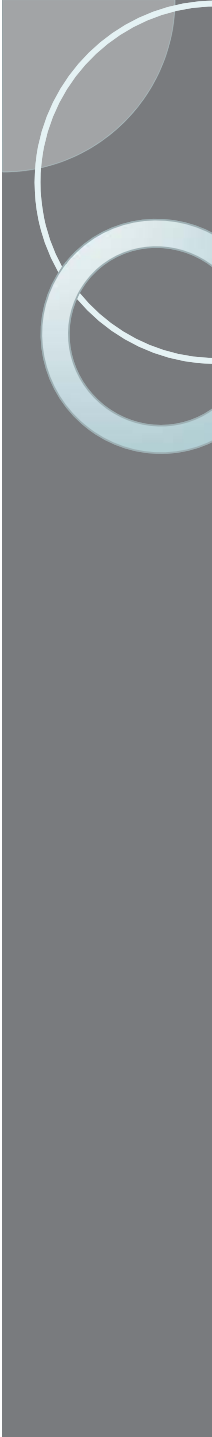
AASHTO Administrative Overhead

- AASHTO Administration & Overhead
 - Staff salaries, benefits, and overhead
 - Contracted Project Manager
 - Proportional share of SCOA, T&AA and indirect costs
 - Legal Services
- Technical and Applications Architecture Task Force
 - Technical resource for SCOA and product task forces
 - Develop and maintain software standards and perform QA Reviews



Why Use AASHTOWare?

- Incorporates “best practices”
- Users share solutions and costs
- License fees cover overall expenses ensure software products are kept current with technology and functional requirements
- Each product is self-supporting
- Non-profit operation
- Management and oversight by agency (DOT) personnel
- AASHTO staff project management/assistance



Task Force Member Appointment Process

- Conduct broad solicitation of interest to member community
- Candidate resumes reviewed by Task Force Chair, SCOA Liaison, and AASHTO Project Manager
- Interviews conducted by same to find subject matter expertise needed to compliment the current Task Force membership
- Candidate recommendation and all resumes received submitted to SCOA for approval

Members allowed to serve two, three-year terms. Special terms may be extended at the direction of the SCOA



AASHTOWare Service Units

- Overview
- Process

AASHTOWare Software Renewals



2018 Bridge Management Customer Satisfaction Survey Results

Conducted July 29 – August 31, 2018



Survey Participation

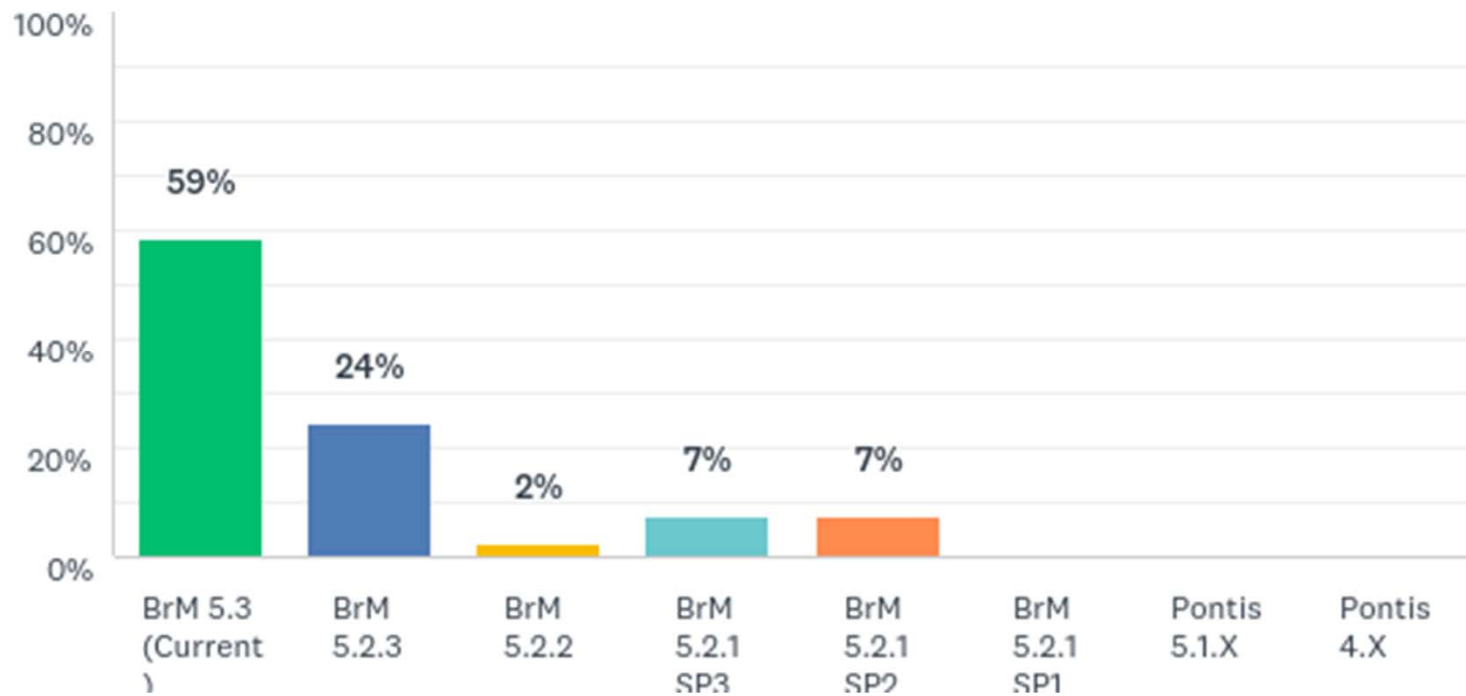
- Member Agency End User Designees were surveyed
 - capture member agency software environment / configuration information
 - 43 Member Agencies responded
 - 31 Member Agencies responded in 2017
 - 43 Member Agencies responded in 2016
 - 29 Member Agencies responded in 2015
 - 33 Member Agencies responded in 2014



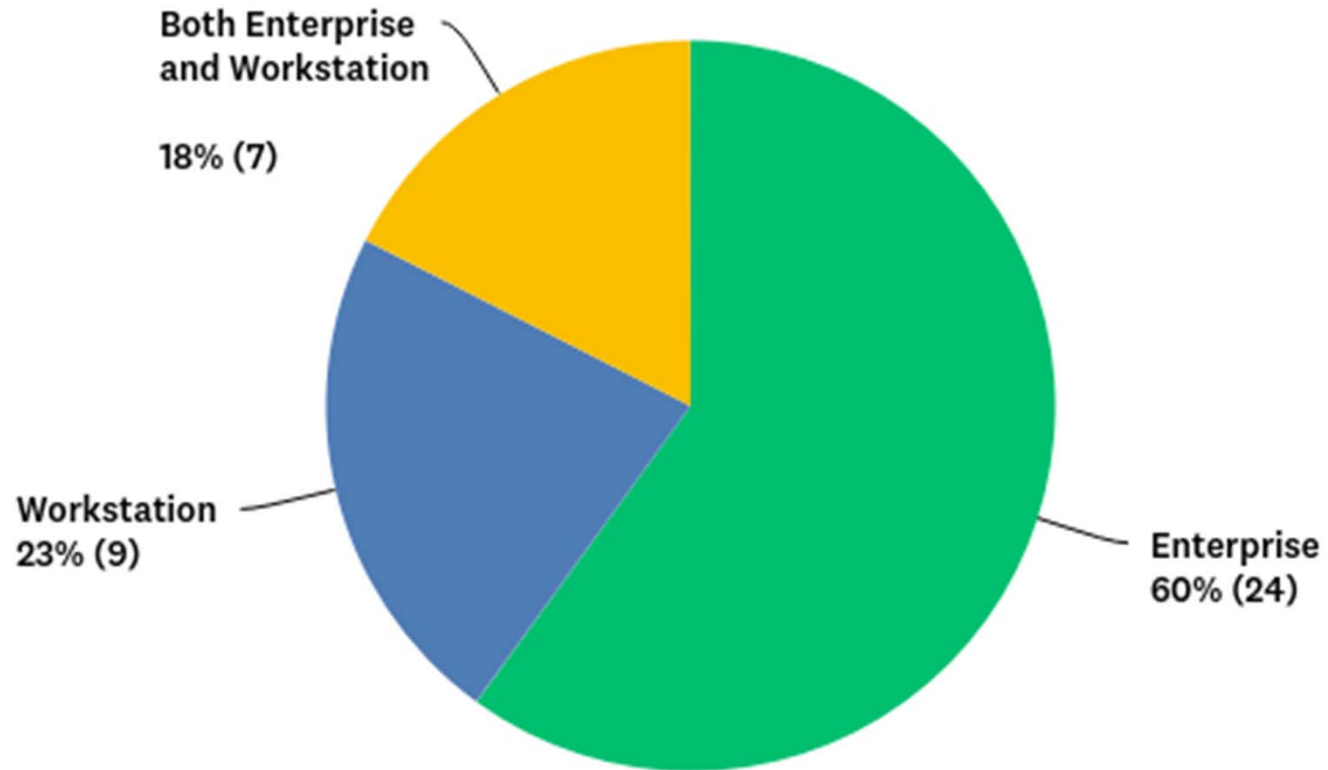
Member Agencies Not Participating in the Survey

- Iowa Department of Transportation
- Puerto Rico Highway and Transportation Authority
- Richmond Metropolitan Transportation Authority

Software Version Used



If you are using version 5.X, which platform are you using?





Agency Customizations to BrM

- None (7)
- Agency Custom Elements (4)
- Agency screens with custom fields, custom filter, layouts and reports (2)
- Agency Custom Screens (4)
 - Critical Findings
 - Overload
 - Scour
 - Load Rating
 - Clearance
- Agency Defined Fields and Smart Flags
- Agency Custom Forms



Agency Customizations to BrM

- Inspect program / separate program for attaching documents, linked to BrM
- Ability to connect to custom inspection data collection interface
- Add vertical clearances, additional rating information to the user tables
- Ability to communicate with SAP for maintenance items
- Custom fields added in USERINSP and USERBRDG tables with corresponding forms/tasks
- Custom Inspection Form, Multimedia Tab, Reports, Utility Screen



Agency Customizations to BrM

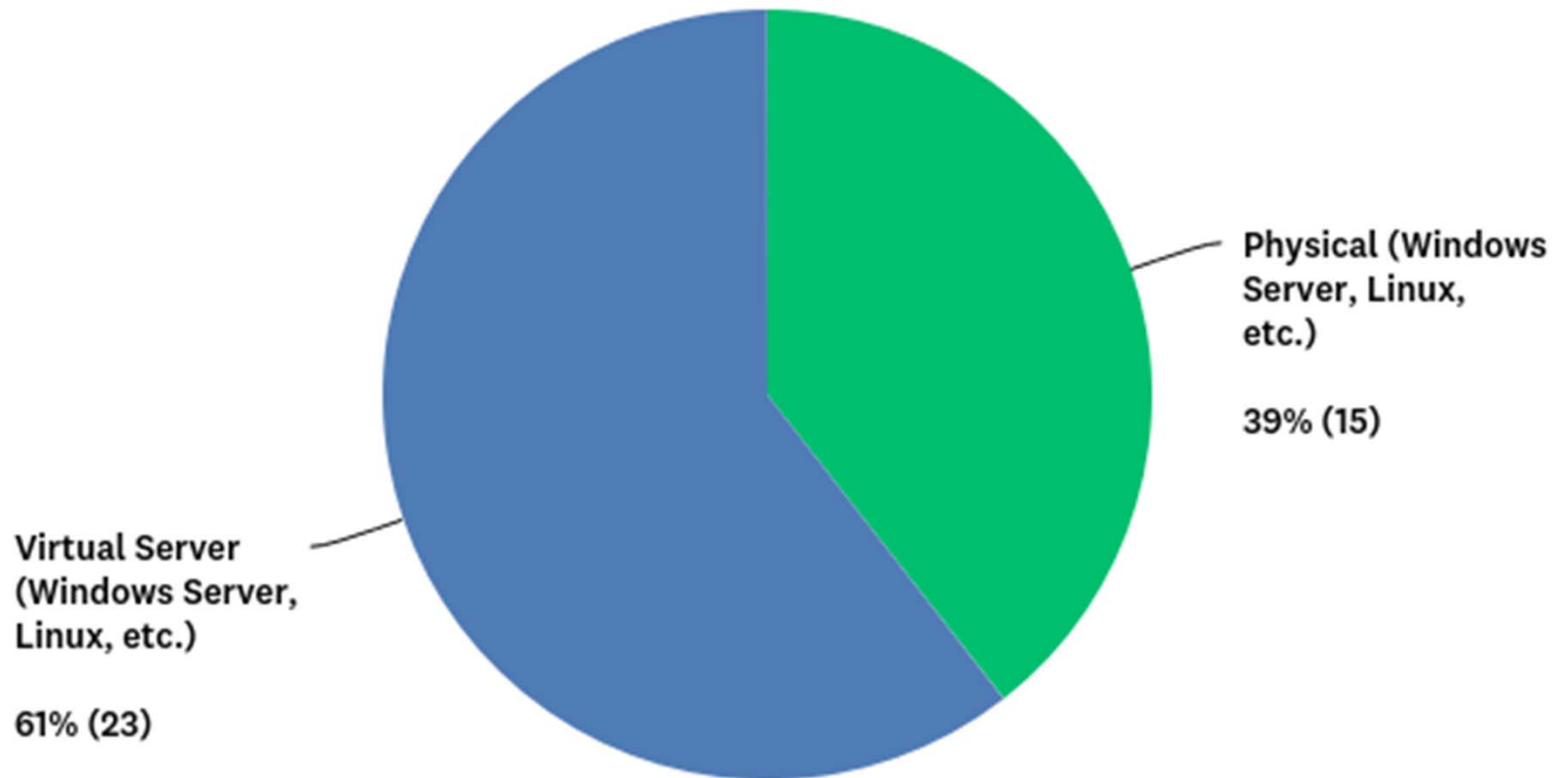
- Custom Reporting, Channel Profile, Mutli-media Interface, Custom Data Fields
- Custom tabs: inspection procedures, channel profile, load rating data, project data, HMLTs
- Customized pages to populate userbrdg, userrway, userinsp, userstrunit.
- Custom settings in options including converting text boxes to dropdowns.
- Customized tunnel page
- Layouts, Filters, Bridge Groups, Reports, Agency pages, Hydraulics data page, Load Rating page, custom Multimedia page, inspection record locking, sharing/importing load rating data from BrR, import traffic data items from IHI system



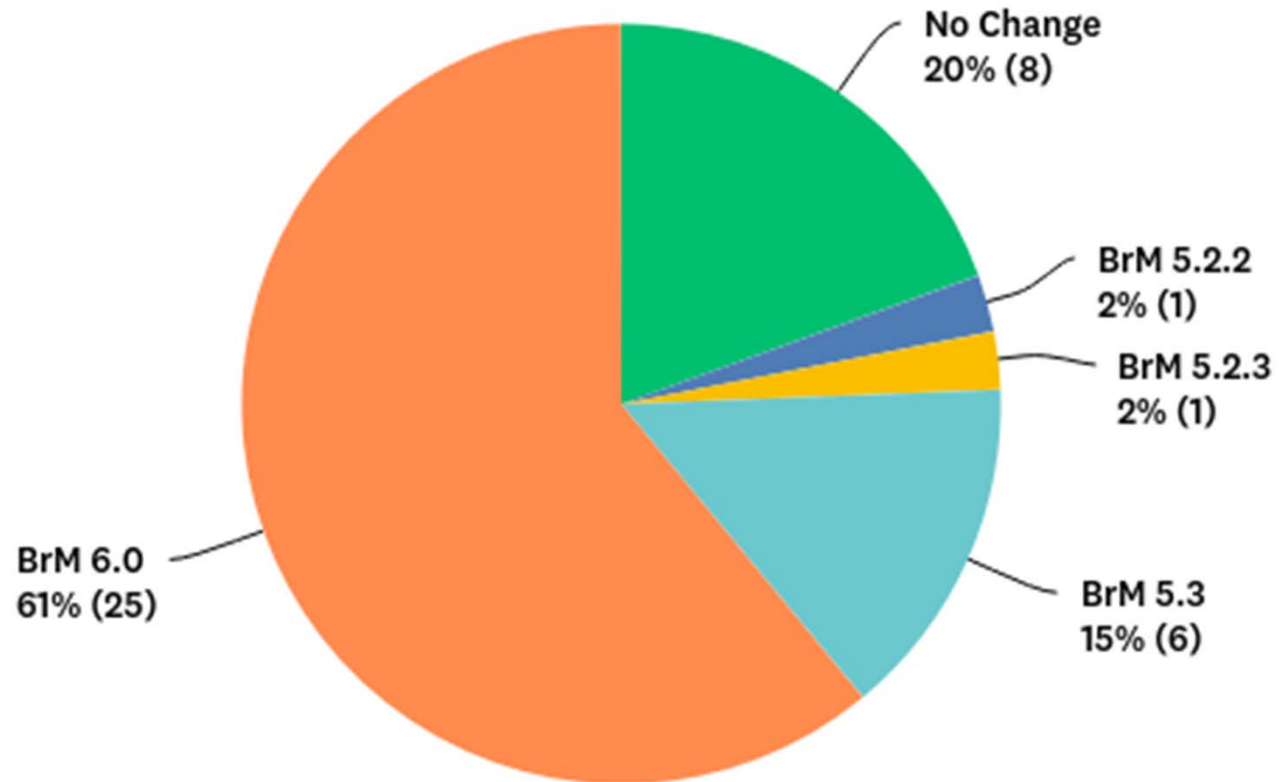
Agency Customizations to BrM

- Media tab, KYTC page, Review
- Only built-in agency items are used. Custom Crystal Inspection Reports. No additional forms or elements have been created.
- Reports, added user fields, custom data entry forms. Custom layouts and filters. Will do more in the future.
- Scheduled Tasks
- Scour TAB

Server Environment



Which version to you plan to move to within the next year?





What do you need to move to a newer version of the software?

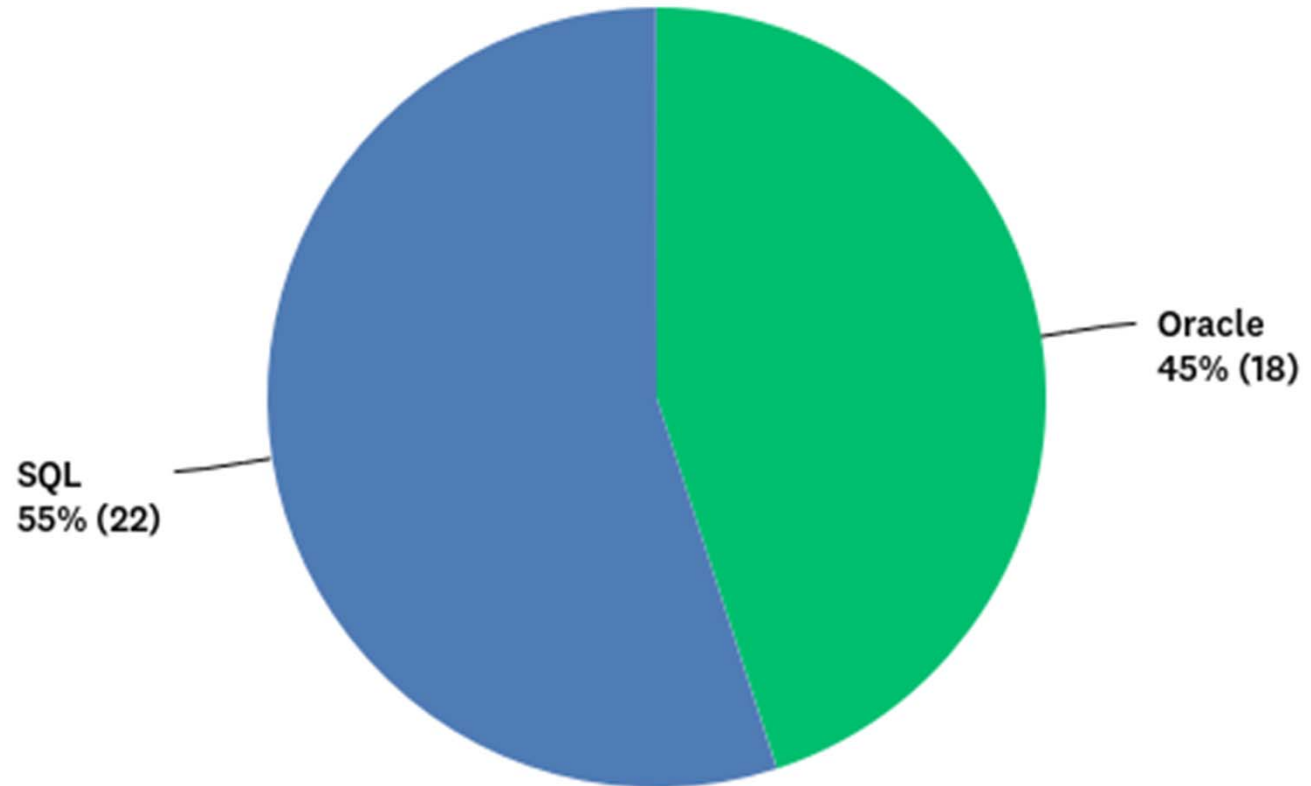
- Need time for testing, troubleshooting and implementing (5)
- IT resources/support (4)
- Our IT staff needs to okay possible security vulnerabilities
- A stable, production ready release of the new software (4)
- Release of BrM 6.0 (3)
- Bug fixes for frozen projects and optimization (2)
- Web Services for data transfer
- New features for asset management
- Batch exports of analysis results
- Need to complete the ongoing inspection cycle



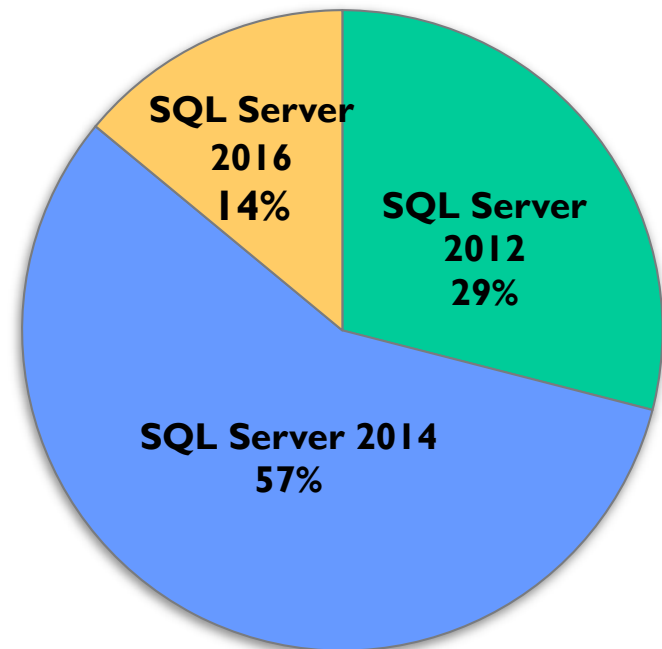
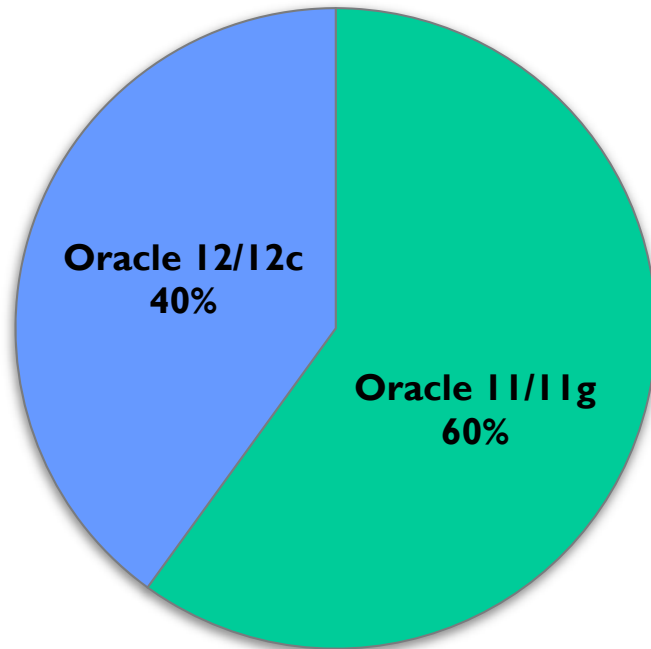
What do you need to move to a newer version of the software?

- Migration of custom pages, reports, and testing
- Testing of our custom Crystal Inspection Reports with BrM 6.0
- Need time to get used to switching to BrM
- We would need to make significant changes to our BMS software and other connected systems

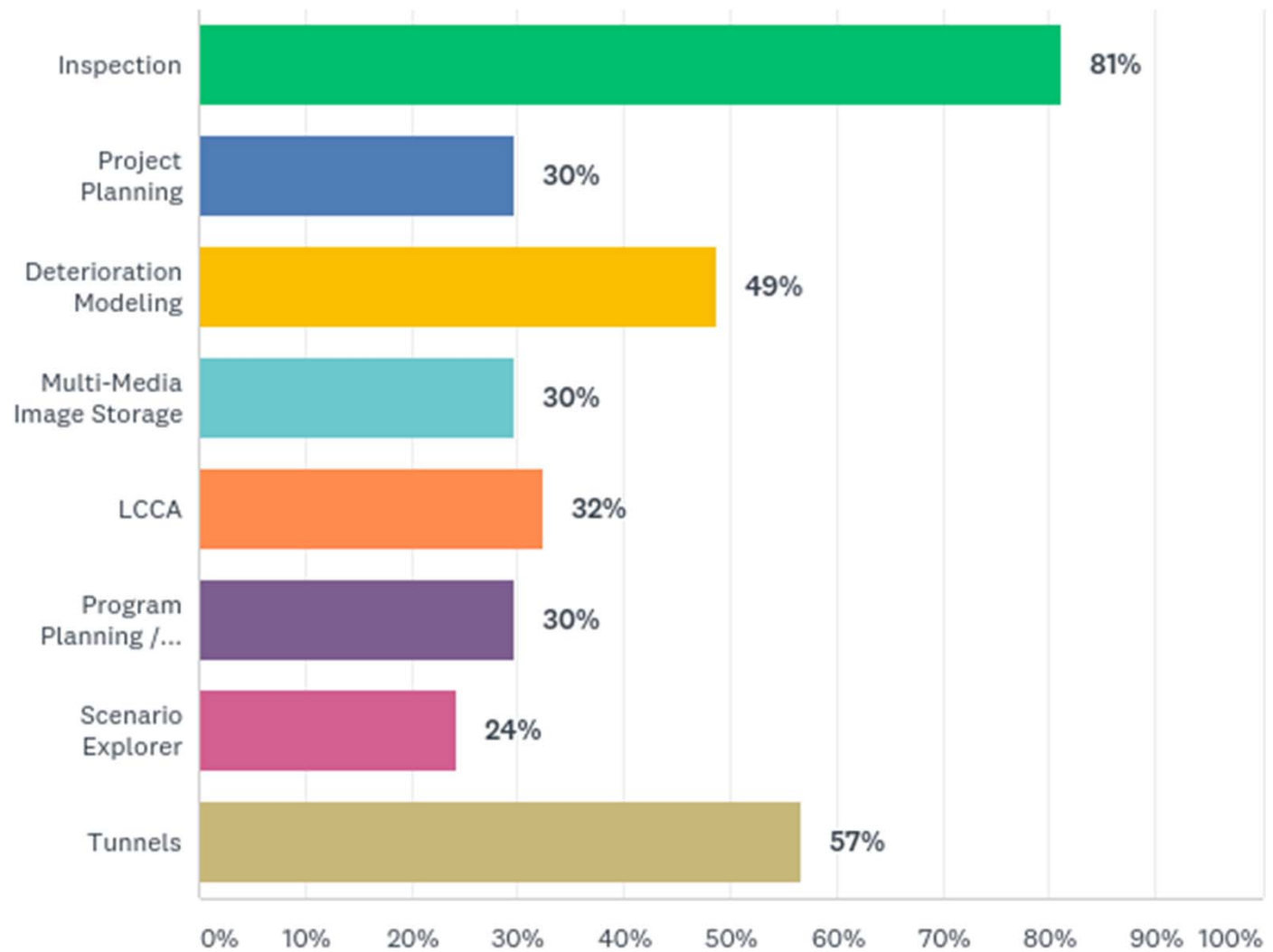
Database Software for BrM Data



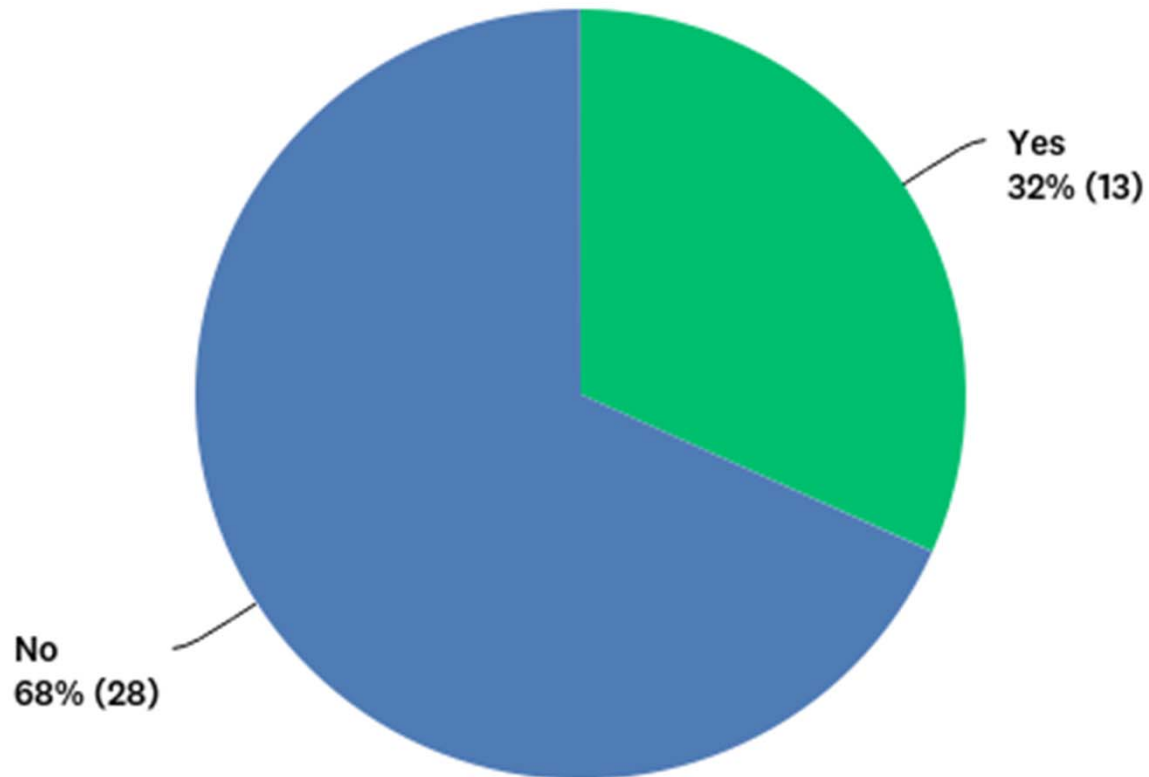
Database Software Version



BrM Features Used



Adjustments to the Deterioration Model, Utility Tree or Rules?





What Deterioration Model, Utility Tree or Rules Adjustments have been made?

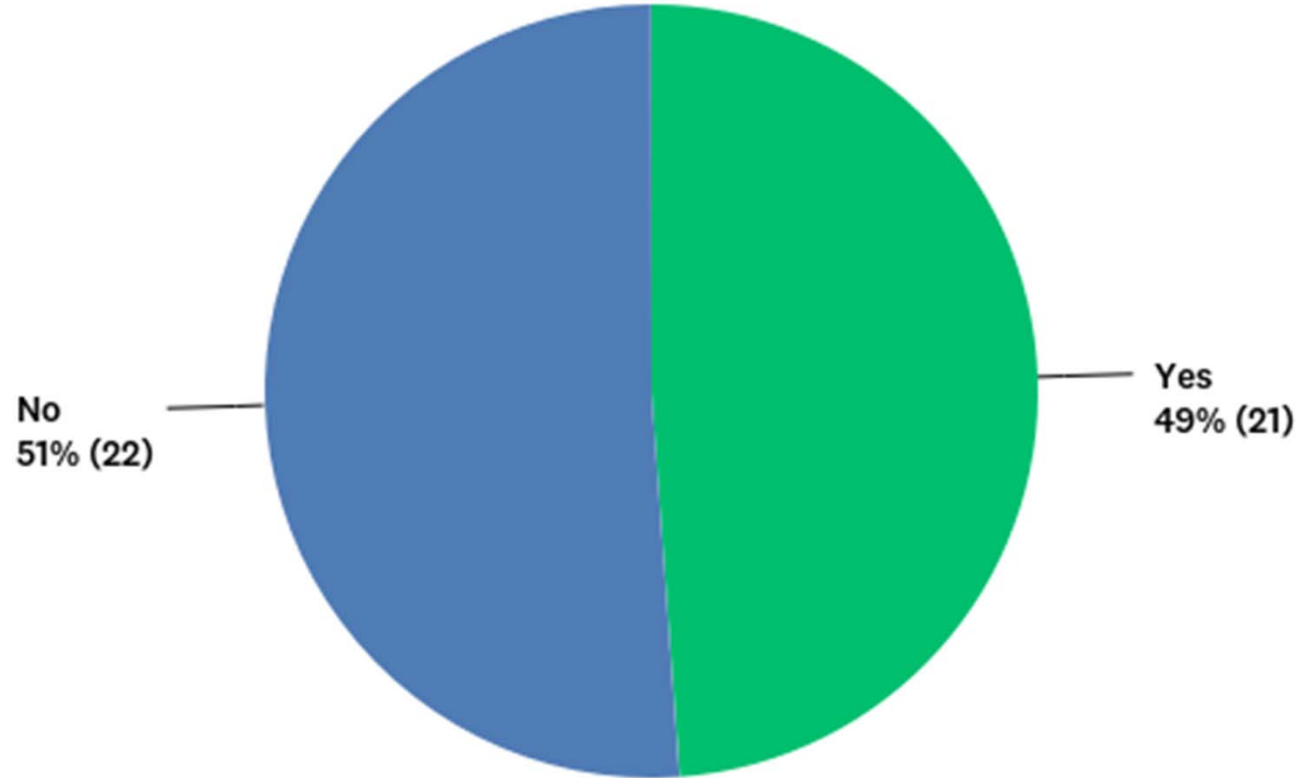
- Element deterioration modeling has been calibrated (4)
- Converted & moved deterioration from Pontis 4.4
- Created our own deterioration models, utilities and rules
- Action-Benefit-Cost models have been developed
- Programs and optimizer have been calibrated as per MAP-21 requirements
- Security setup for admins and users
- Web services using datapower for transferring of data from InspectTech to BrM
- Analysis for TPM
- Numerous modifications have been made to model our environments and bridges



What Deterioration Model, Utility Tree or Rules Adjustments have been made?

- Customized nodes on Utility tree and created multiple weight profiles
- Set up custom Benefit Groups, Actions, Network Policies and Life Cycle Policies
- We are just in the beginning stages, but we have started to modify element deterioration models, utility function, NBI deterioration modeling
- We have been working with Zac & Vasil with service unit project
- Comprehensive. Talk to Zac

Are you using Third Party Software in addition to BrM for Inspection Data Collection?

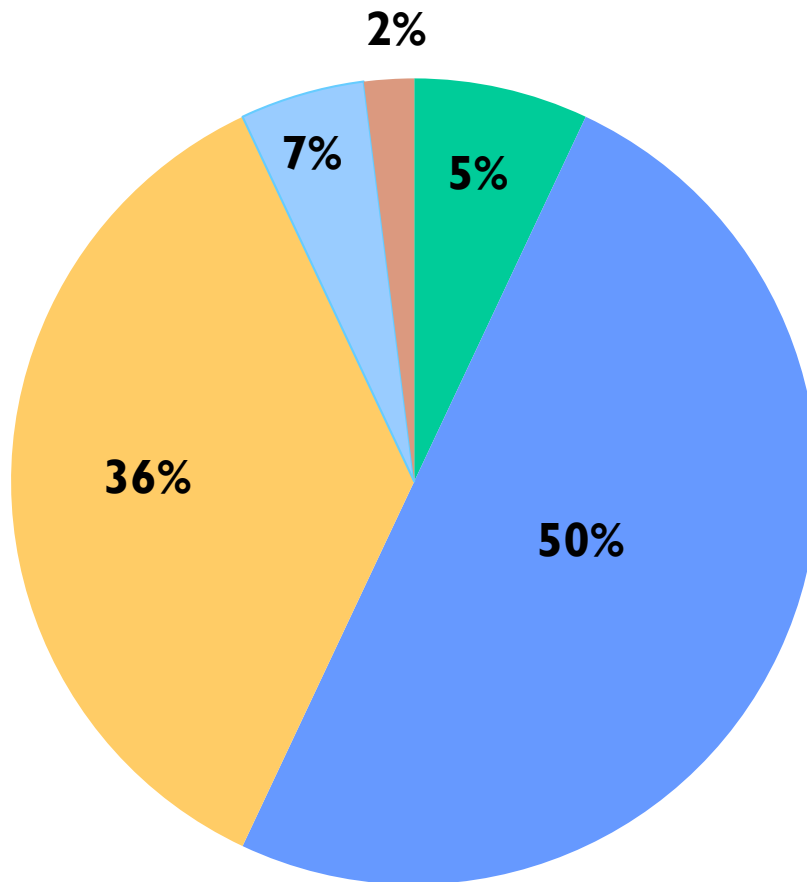




If Yes, What Software?

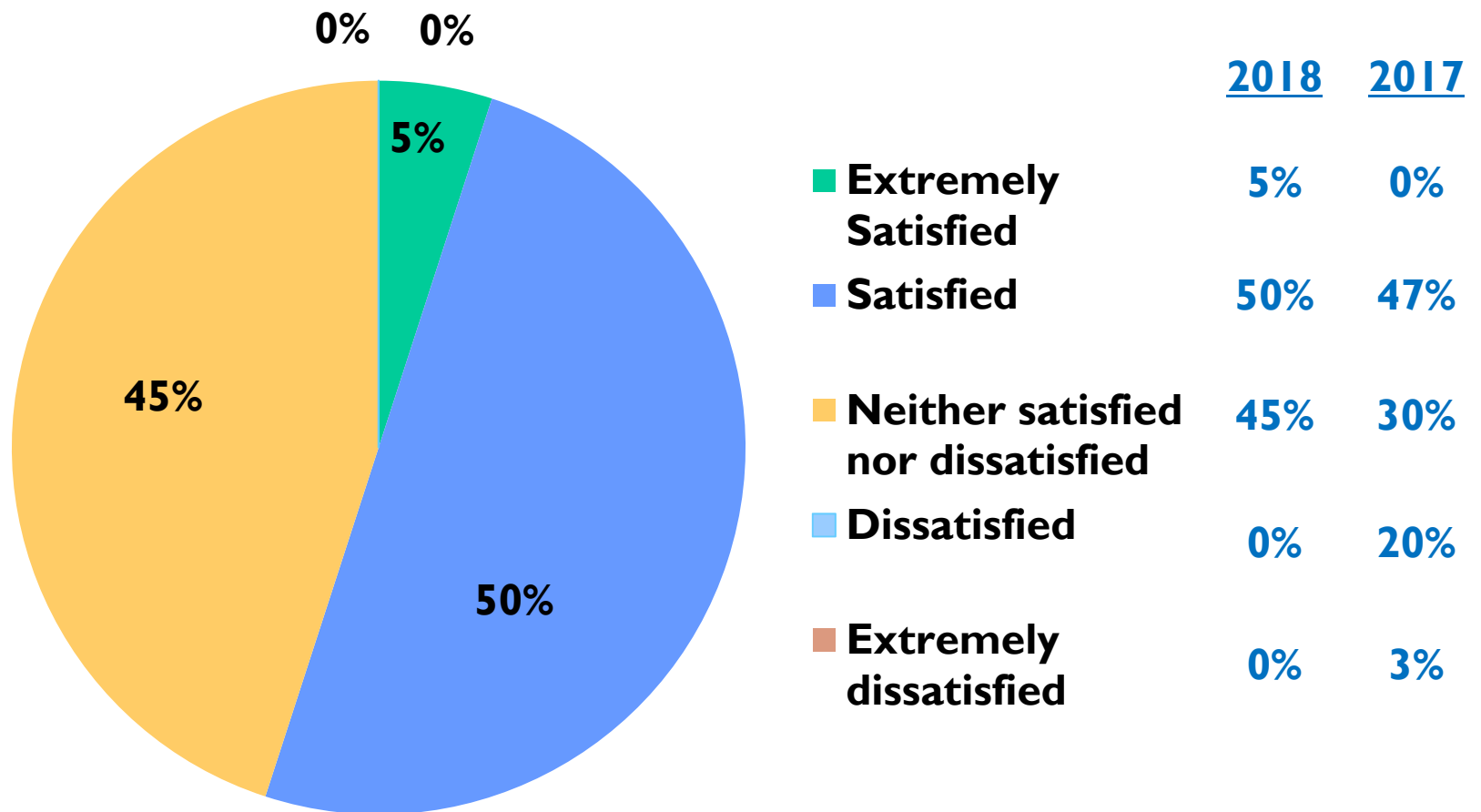
- In House developed software (10)
- Local system (city & county bridges) uses in-house inspection forms to support input into the in-house designed web portal
- Simplistic in-house mobile app to collect inspection data on iPads. Looking to make enhancements to that software.
- Bentley InspectTech (6)
- Microsoft Access and Excel (2)
- Agile Assets
- Not yet - currently exploring potential candidates.

Ease of Installation

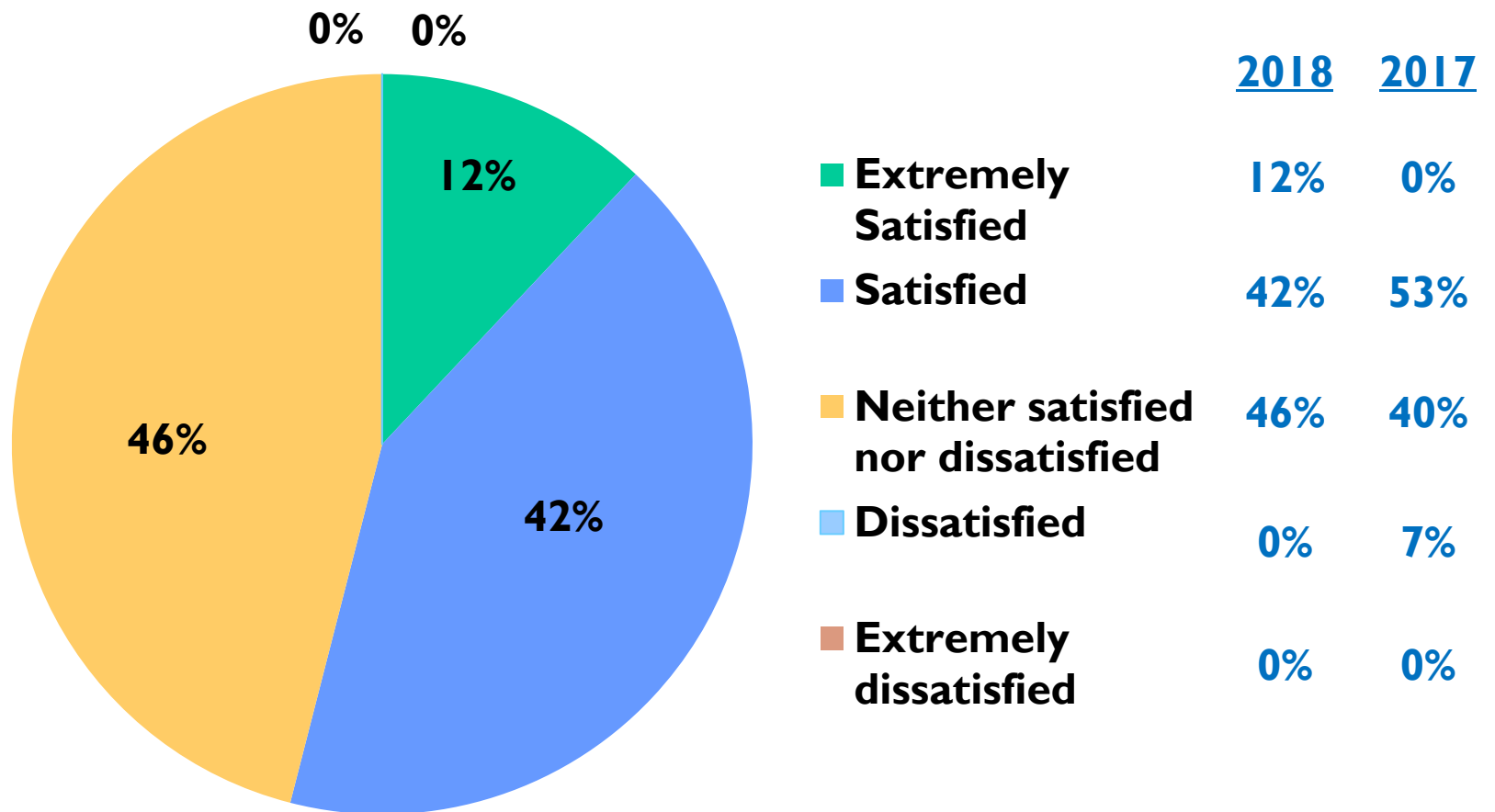


	<u>2018</u>	<u>2017</u>
■ Extremely Satisfied	5%	0%
■ Satisfied	50%	50%
■ Neither satisfied nor dissatisfied	36%	27%
■ Dissatisfied	5%	23%
■ Extremely dissatisfied	2%	0%

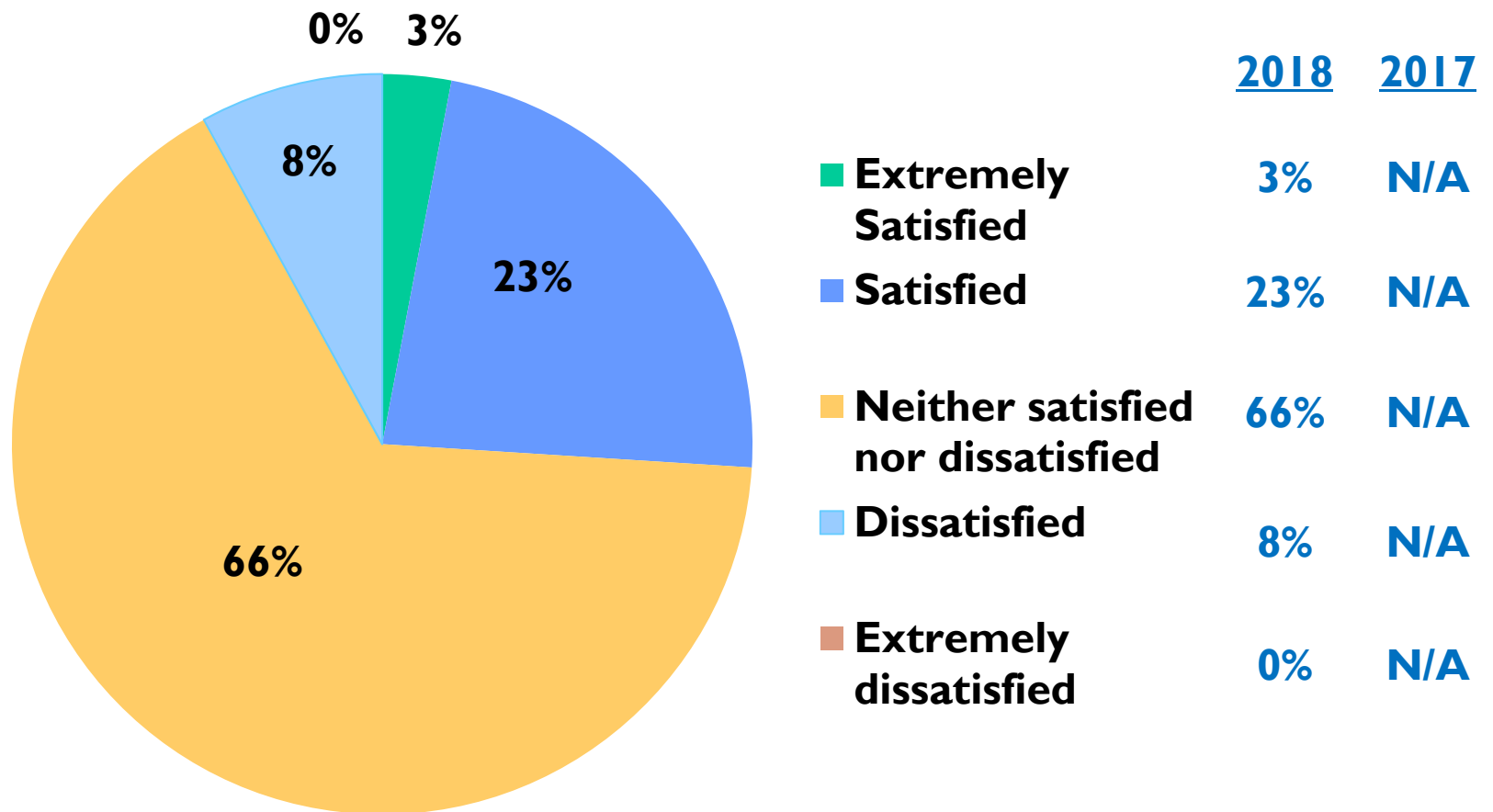
Software Operation (speed, ease of use, reliability)



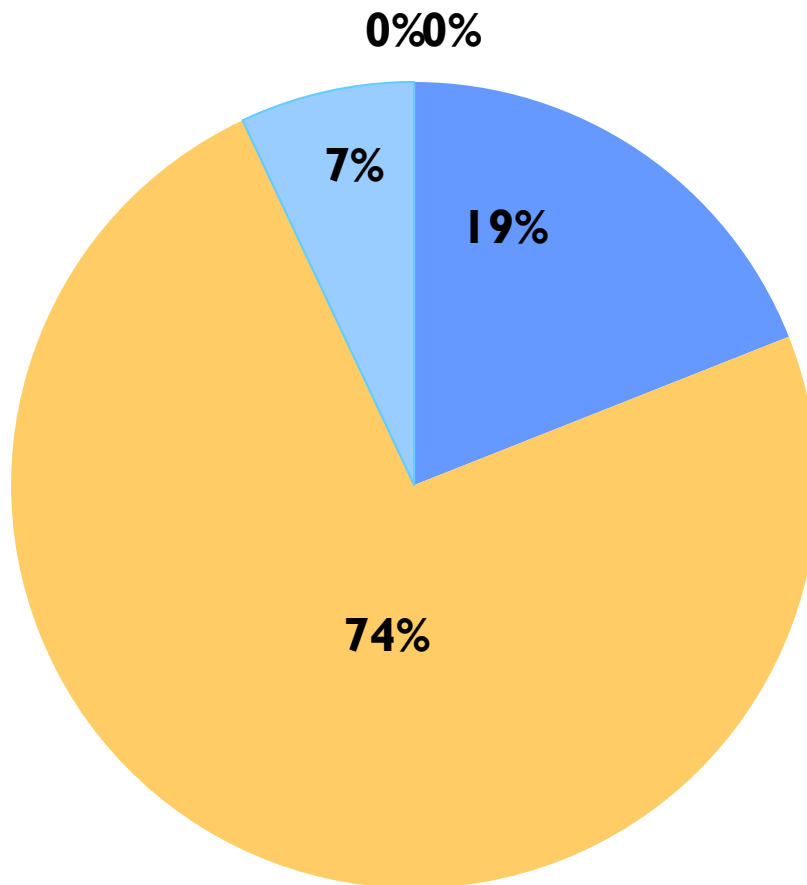
Inspection Features of BrM



Modeling, Analysis & Optimization Features of BrM



Reports (delivery, quality and completeness)

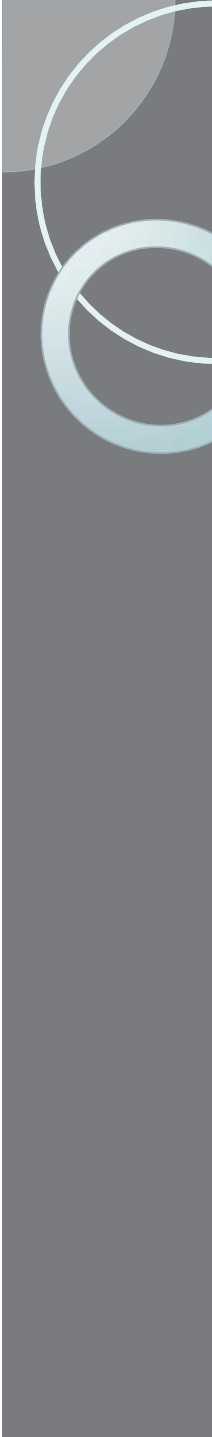


	<u>2018</u>	<u>2017</u>
■ Extremely Satisfied	0%	0%
■ Satisfied	19%	23%
■ Neither satisfied nor dissatisfied	74%	64%
■ Dissatisfied	7%	13%
■ Extremely dissatisfied	0%	0%



Enhancements to support features not currently used

- Enhanced editing/modifying of utility function and how it calculates the utility value
- Enhanced editing/modifying of NBI deterioration based on element data.
- Respect frozen projects during optimization
- Align funding as per STIP
- Develop a Structure Weight form
- Provide more information on the project selection process along with scores
- Utilize MODA to develop a cross assets allocation function
- Ability to export modeling results for a selected set of bridges.



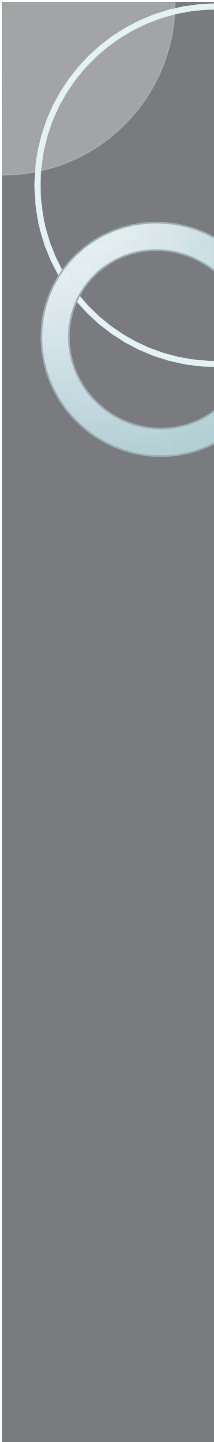
Enhancements to support features not currently used

- Additional tools to help export bridge NBI and NBE data for FHWA submission
- Fix optimizer to allow recommend repetitive work
- Better Optimizer results screen listing bridge work prioritized by weighted benefit cost ratio
- Allow multiple unit costs per action to account for different condition states
- Allow multiple individual Indirect Cost Formulas to be stacked and added to an action instead of one large formula field
- Allow the use of environment factors for NBI deterioration models



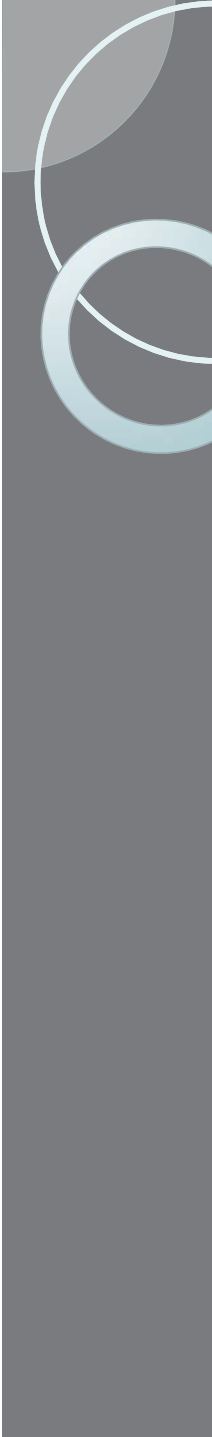
Enhancements to support features not currently used

- Greater ability to import data from other applications, i.e. being able to import a list of projects from Excel or Access would be helpful
- Better documentation, such as a step-by-step set-up process for the new modules would also be helpful
- Having an interface that allows the use of SQL Server Reports or Oracle Reports
- Manuals and examples that fully explain how things are intended to be used... modeling, etc.
- Modifications to the life cycle cost analysis need to be completed including the deterioration models



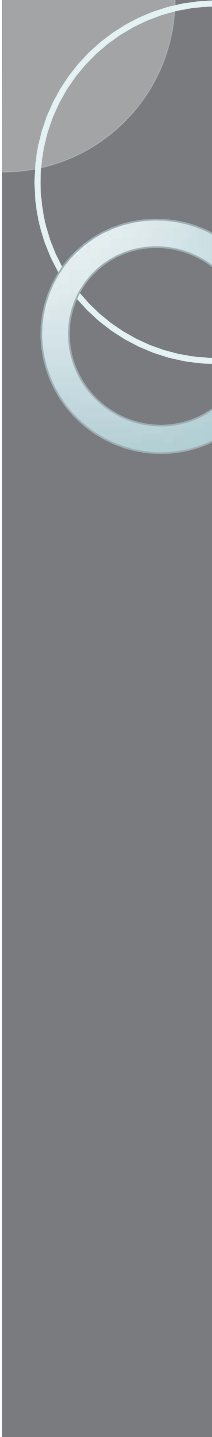
Enhancements to support features not currently used

- Multimedia features, credential storage, documentation that provides a clear and accurate description for the version of the new changes or enhancements (previous documentation has screen captures or information related to previous versions)
- Multimedia support should be provided for Tunnels. Currently we are utilizing the Bridge Multimedia on Retired Tunnels as bridges to store and print our Tunnel Photos with a custom report. Also we are using the bridge Work Candidates to store and print our Tunnel Repair/Maintenance items with a custom report



Enhancements to support features not currently used

- More training to be able to use a lot of the features
- Easier Report generation
- Some reports are loading error in BrM v5.2.3
- Setup for modeling and programming should be more intuitive and should not require an additional project with Bentley to get the state up and running
- Tunnel Work Candidates
- We'd like to continue to hone in on our deterioration modelling and optimization
- Usability improvements and better documentation
- Agency time to start developing our models



Enhancements to support features not currently used

- Most of the agency issues are due to locking out of features that Administrator has access to. This functionality, at our organization, unfortunately has been given to IT.
- None - the rigid one-size-fits-all nature of the application restrict comprehensive usage.
- Need staff dedicated to bridge management.

Use of Technical Support from Bentley - 77% of respondents

	Extremely satisfied	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied	Extremely dissatisfied
a) quality of the support provided	26% 7%	53% 67%	18% 22%	0% 4%	3% 0%
b) contractor communication and follow-up	21% 15%	53% 67%	18% 11%	5% 7%	3% 0%
c) effectiveness of contractor telephone & e-mail support	24% 15%	47% 55%	26% 26%	3% 4%	0% 0%
d) knowledge of the contractor help desk staff	35% 19%	50% 55%	15% 19%	0% 7%	0% 0%
e) overall quality of contractor problem resolution	21% 7%	53% 52%	21% 26%	5% 15%	0% 0%

Use of Development or Custom Technical Support - 40%

	Extremely satisfied	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied	Extremely dissatisfied
a) quality of the support provided	38% 0%	13% 73%	44% 18%	5% 9%	0% 0%
b) contractor communication and follow-up	19% 0%	31% 50%	25% 42%	25% 8%	0% 0%
c) effectiveness of contractor telephone & e-mail support	25% 0%	25% 64%	38% 36%	12% 0%	0% 0%
d) knowledge of the contractor help desk staff	31% 8%	38% 59%	31% 25%	0% 8%	0% 0%
e) overall quality of contractor problem resolution	27% 0%	13% 50%	47% 25%	7% 25%	6% 0%



Comments on Contractor Support

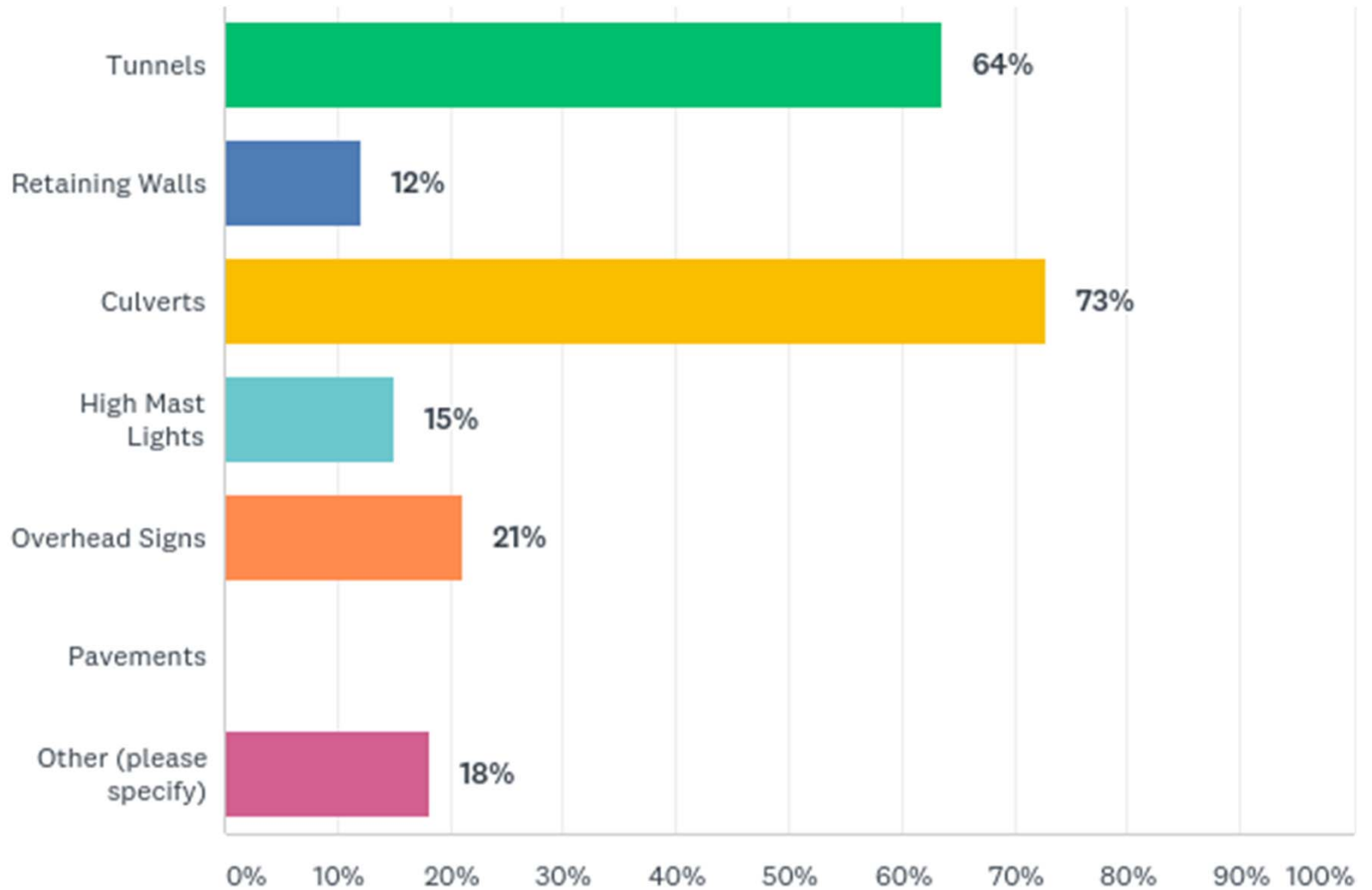
- Great Supportive Team. Thank you!
- I have a good working relationship with Justin, Corey, Zac and Chris.
- Bentley staff are very knowledgeable and helpful in resolving issues and working to accommodate user needs.
- Bentley staff appear to be over-committed for the number of staff they have on the project
- Bentley's effort appears to be concentrated more on moving ahead than on fixing existing problems. Fixes keep getting moved to the next version.



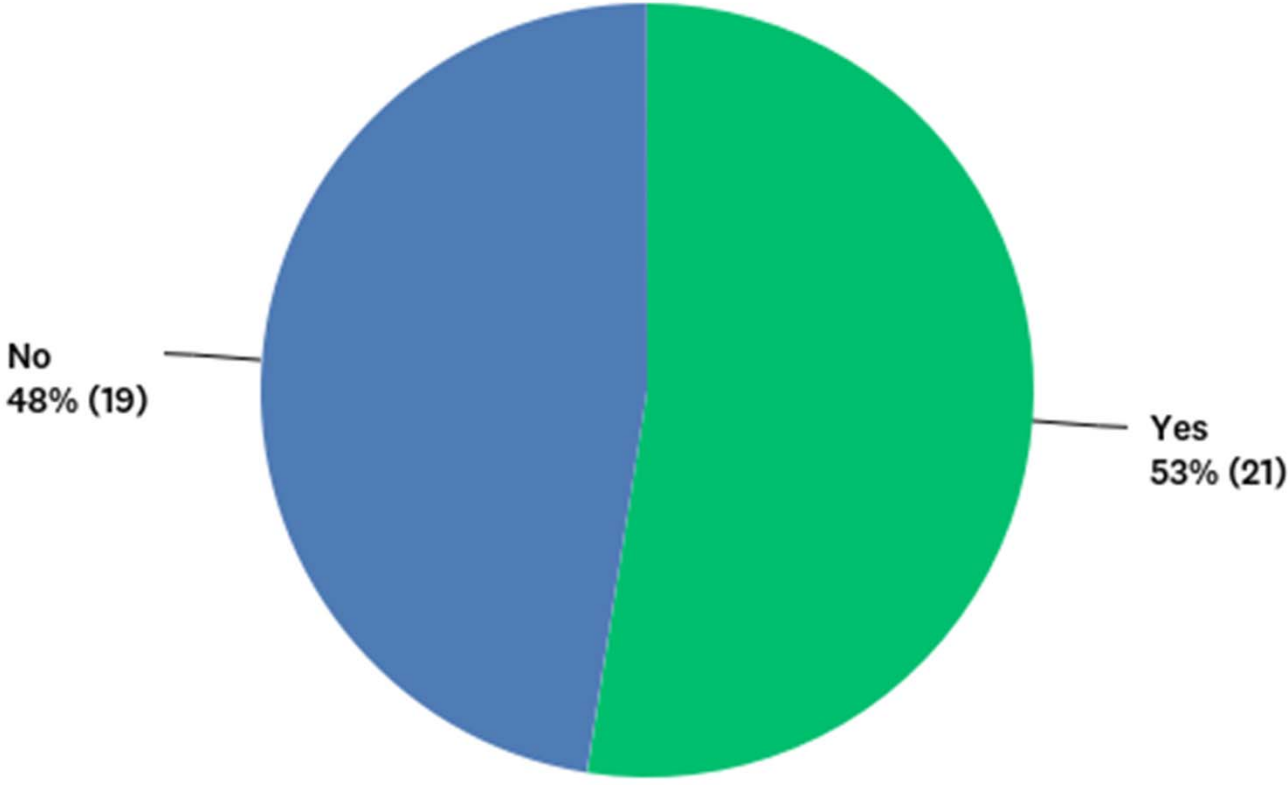
Comments on Contractor Support

- Our only attempt to have Bentley provide customized support was to have them host BrM in the cloud. It took months to get answers to basic questions, and then we received a very expensive quote to proceed. We decided to use a different vendor.
- Response time to issues could be improved.
- Streamline the process of data transfer between other software such as InspectTech

Assets other than Bridges?



Third Party Software Integrated with BrM or using BrM Data





If Yes, What Software Tools

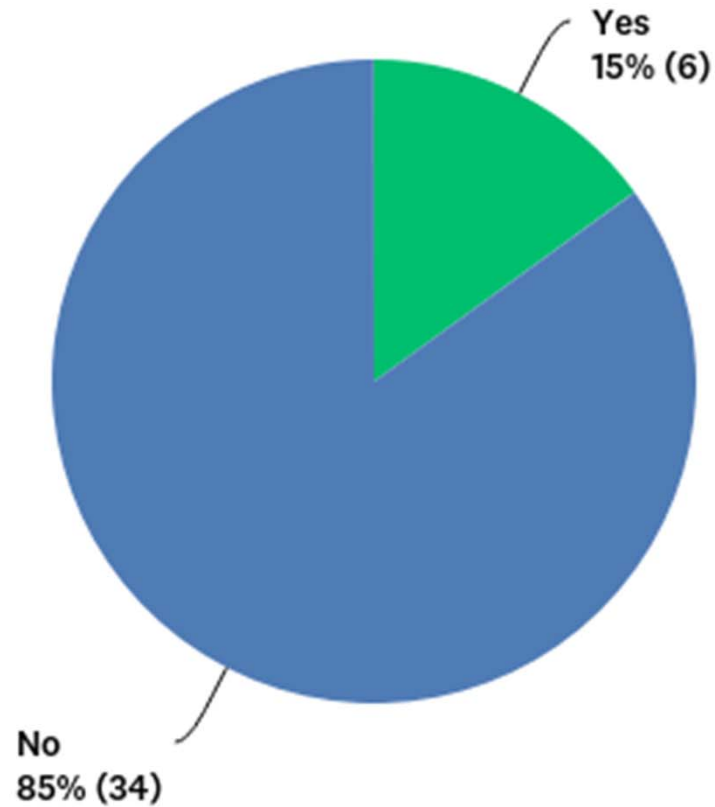
- In-house applications (15):
 - inspection forms
 - web portal
 - photo attachments
 - permitting analysis
 - project management
 - executive dashboard
 - roadway management system
- ArcGIS / ArcMap (3)
- Google Earth / Google Maps (3)
- Microsoft Excel / Access / Mathematica (2)
- Adobe photoshop for picture documentation
- Performance Measure Metrics (Socrata)

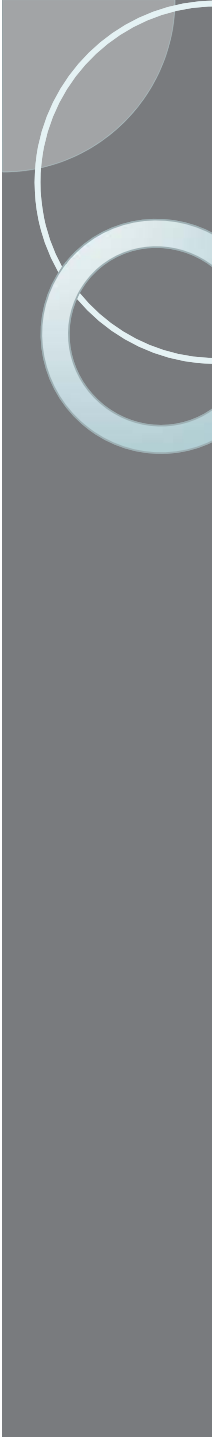


If Yes, What Software Tools

- Agile Assets Maintenance Management System
- Custom Reports Application, Scour Plan-of-Action Application.
- Infomaker
- VUEWorks
- dTIMS
- HPMS

BrM Development Outside of the Service Unit Process?

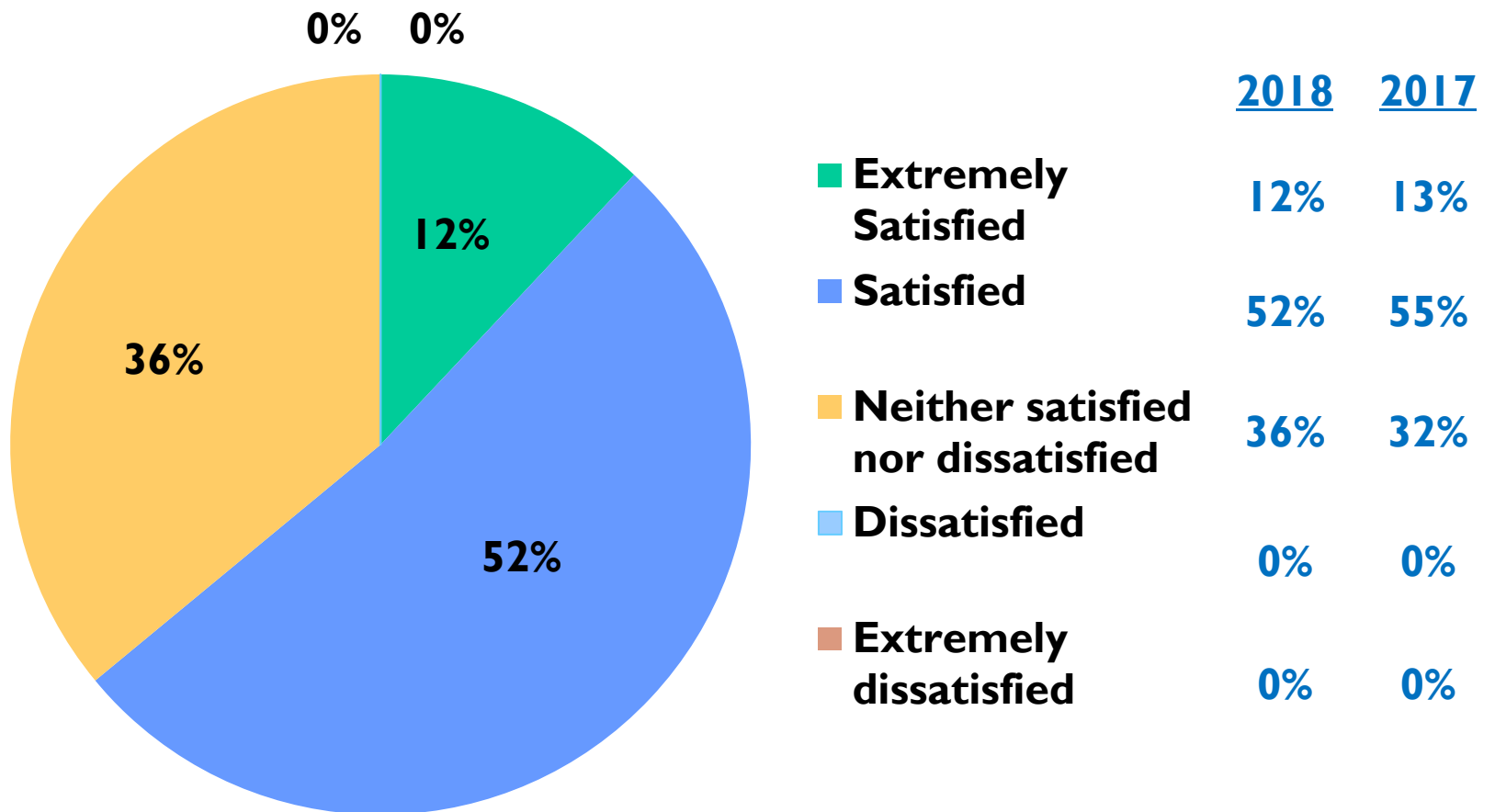




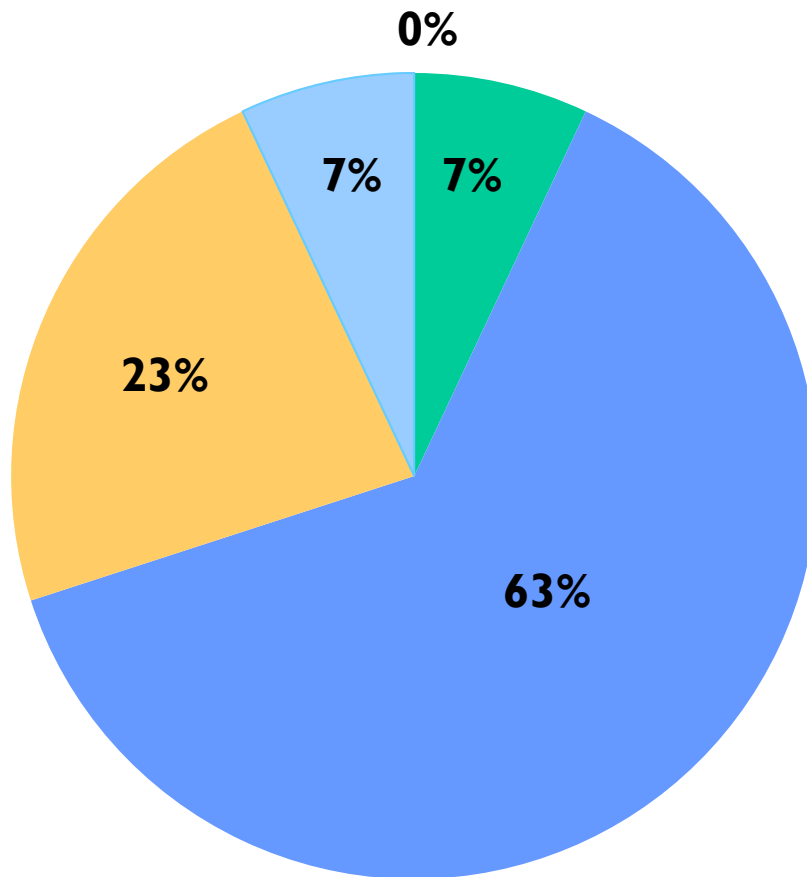
If Yes, What is the Scope of Your Current Project?

- Creating, updating, and enhancing custom reports
- Hosting
- Project is being completed by in-house staff:
 - Customizing element and NBI deterioration models
 - Customizing utility function
 - Customizing work actions, costs, and benefit parameters.
- Migration of data and custom enhancements.
- Upgrade of the load rating system

Agency / Task Force Contact



Task Force Responsiveness



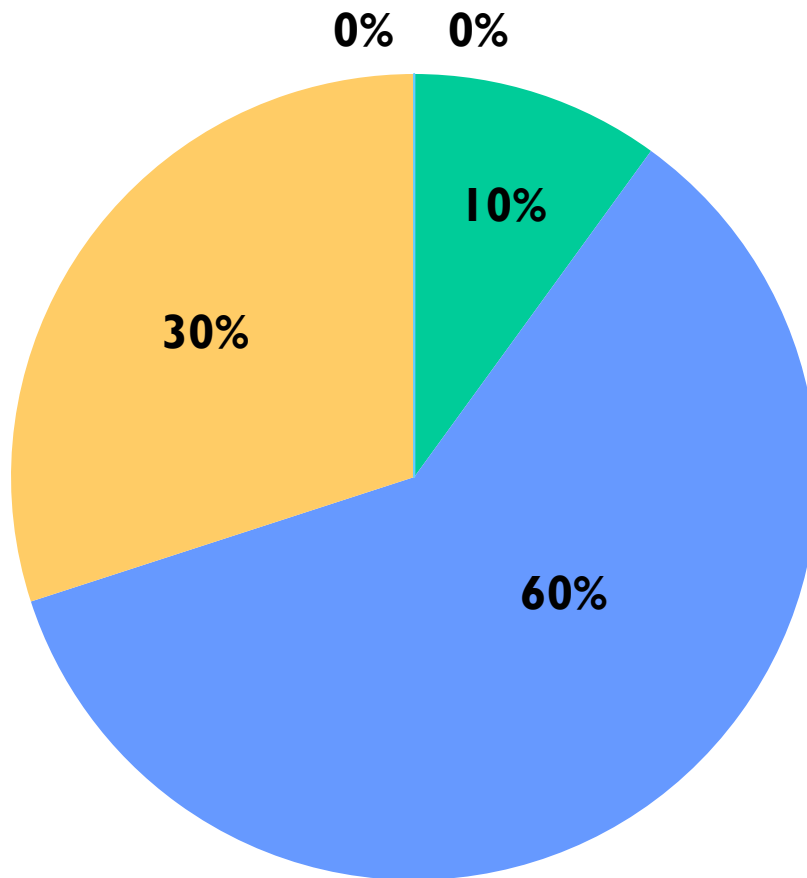
	<u>2018</u>	<u>2017</u>
■ Extremely Satisfied	7%	10%
■ Satisfied	63%	48%
■ Neither satisfied nor dissatisfied	23%	32%
■ Dissatisfied	7%	10%
■ Extremely dissatisfied	0%	0%



Suggestions for Improvement Agency / Task Force

- A regular newsletter (at least quarterly, if not monthly) would help to keep users informed.
- Communicate that users need administrative rights to use BrM, and that SQL is the best tool for managing the data. Using XML to manage the data, or using the lock and sign buttons, on a per bridge basis is not time efficient.
- Improvement prioritization changes mysteriously after BrMUG meetings
- Need more Bentley staff for Service Unit work

User Group / Task Force Relationship



	<u>2018</u>	<u>2017</u>
■ Extremely Satisfied	10%	3%
■ Satisfied	60%	71%
■ Neither satisfied nor dissatisfied	30%	23%
■ Dissatisfied	0%	3%
■ Extremely dissatisfied	0%	0%



Suggestions for Improvement User Group / Task Force

- Better communication with the users
- Share decisions and follow-up with the users
- Address specific JIRA issues periodically - Notify users when a ticket status has changed.
- Share validation of models
- Share DOT Successes and Failures
- Develop a maintenance module
- Better documentation of bugs, patches, release notes, and 'enhancements' - which are being implemented, which could be implemented with additional funding, which have been suggested, but aren't likely to see attention
- Better documentation



Suggestions for Improvement User Group / Task Force

- A central location (not Facebook, since that seems to have died) where these things are available and can be discussed.
- Improvement prioritizations change mysteriously after BrMUG meetings
- The Task Force should be allowed to stay for the open discussion



Specific Issues / Concerns

- Frozen Projects and Structure Weight Formula
- Long-term costs seem to be too specific.
- Need to really move to a multi-asset application. Make every inspection tab available for any asset, i.e. Multimedia, Work Candidates.
- Speed improvements need to be made when opening the Work tab in 5.3.
- The product is not stable. Additional versions are developed without fixing all bugs in the previous version. BrM seems to be a continual revolving updated project instead of a consistent, reliable product. We have had to make quite a few workarounds to make 5.2.1 SP3 work, but Bentley deferred all bug fixes to 5.3.



Most Significant Bridge Management Challenge

- Chronic understaffing and increasing demands from leadership, FHWA, legislature, etc. (9)
- Having sufficient staff to learn, modify, and customize the program to suit our specific modeling needs for
- Lack of available training material and documentation
- Internal agency issues
- Modeling and project selection using the software
- Funding
- Upper management and traveling public buy in to spending money to maintain an aging inventory.
- Ability to proactively determine which projects to fund



Most Significant Bridge Management Challenge

- Coordinating the data from all the different internal sources into data that can be reliable and accurately used in other areas of the Agency.
- Cost-benefit analysis.
- Customization to improve ergonomics/intuitive-use for inspectors & managers
- Data flexibility, collection, interfaces, accessibility
- Deterioration modeling and setting up all of the things for optimization (3)
- Generating real time condition reports for bridges
- Getting the access data into the BrM through the user interface, without administrative control, and without using SQL. IT is the only department with SQL access.



Most Significant Bridge Management Challenge

- Accomplishing all the needs of Bridge Management into one piece of software.
- Getting the project modules up and running. We need more Zacs.
- Getting used to using BrM
- Staying on top of software changes, federal metric changes, and needing more functions to be automated.
- Understanding the program/project modules, how it works, what causes what output, etc.
- Reporting/tracking data when bridge data is updated constantly.
- Setup of programs or projects



Most Significant Bridge Management Challenge

- Need for customization necessary for implementation
- Interaction with bridge Maintenance and Operations unit, and bring Preservation program on board with BrM
- Completeness and accuracy of bridge management data.
- Importing our current bridge inventory data and obtaining element level data in order to utilize some of the management functions and applications.



Most Significant Bridge Management Challenge

- LCCA and project planning and data QA/QC (2)
- Tracking work on particular structures; predicting component deterioration; and forecasting future performance given various funding levels.
- Implementation of asset management processes and procedures.
- Preparing bridge work models and performance forecasts based on funding scenarios in support of Transportation Asset Management Plans



Specific BrMUG Training Topics

- Management/project and program planning (4)
- IT/database support (2)
- Life cycle cost analysis (2)
- Bridge Management Concepts
- Admin training
- Maintenance workflow
- Discussion on Utility Values used by the states
- How to track maintenance history using existing tools, i.e. "Projects"
- Integrating BrM with newer technology--Tablets, Drones, Non-Destructive Evaluation and its software.
- GUID support/knowledge
- Modifying the utility function/value calculation



Specific BrMUG Training Topics

- Modifying NBI deterioration rates based on element condition ratings
- Walkthroughs on project prioritization and work optimization.
- Crystal Reports / Report generation (2)
- Setting up Network Policies and Life Cycle Policies
- Optimization and incorporating life cycle costs
- Setting up scenarios and running Optimizations.
- Deterioration modeling
- xml import techniques for moving data into BrM, and using xml import techniques to lock inspection records.



Questions / Comments?



AASHTO Expense Reimbursements

Concur – A majority of the AASHTO travel reimbursements will be handled via electronic input, submission, and approval.

- Judy Tarwater will conduct a brief Concur “how-to” session this afternoon at 5:00 for AASHTO member agency attendees.

Current Travel Reimbursement form on the BrMUG website

- For those AASHTO-reimbursable attendees who require travel reimbursements to go through their agency, the manual travel expense reimbursement process may be used. Sign reimbursement form, scan form and receipts, email submission to Judy Tarwater jtarwater@aaashto.org