COBie Case Study:

Case Study & Survey Results

Presented By:

Hyde Griffith, PE, Vice President, Broaddus & Associates

Not Present:

Mark Cervenka, Facility Manager, Texas A&M Health Science Center

buildingSMARTalliance™
a council of the National Institute of Building Sciences

TEXAS A&M

HEALTH SCIENCE CENTER

BROADDUS & ASSOCIATES

INNOVATIVE PROJECT MANAGEMENT AND PLANNING

Texas A&M Health Science Center
College Station, TX
100 miles NW of Houston

Project Phase	Contracting Phase	Information Captured	Case Study Scope
Requirement	Programming	Space Program	No
		Product Program	No
Design	Documents	Early Design	No
		Schematic Design	No
		Coordinated Design	No
		Design Reviews	No
	Specification	Product Specifications	No
		Product Discovery	No
Construction	Bidding	Bid Inquiries	No
	Selection	Preparation and Submittal Review	No
		Shop Drawings	No
	Installation	Installed Product	☑
		Inspect Products	☑
		Punch List	No
	Commissioning	Capture Warranty Data	☑
		Capture Maintenance Data	☑
		Capture Systems Data	☑
		Capture Commissioning Records	☑
Operations	Not Applicable	As-Built Data and Documents	☑
		Information to Support O&M Needs	☑

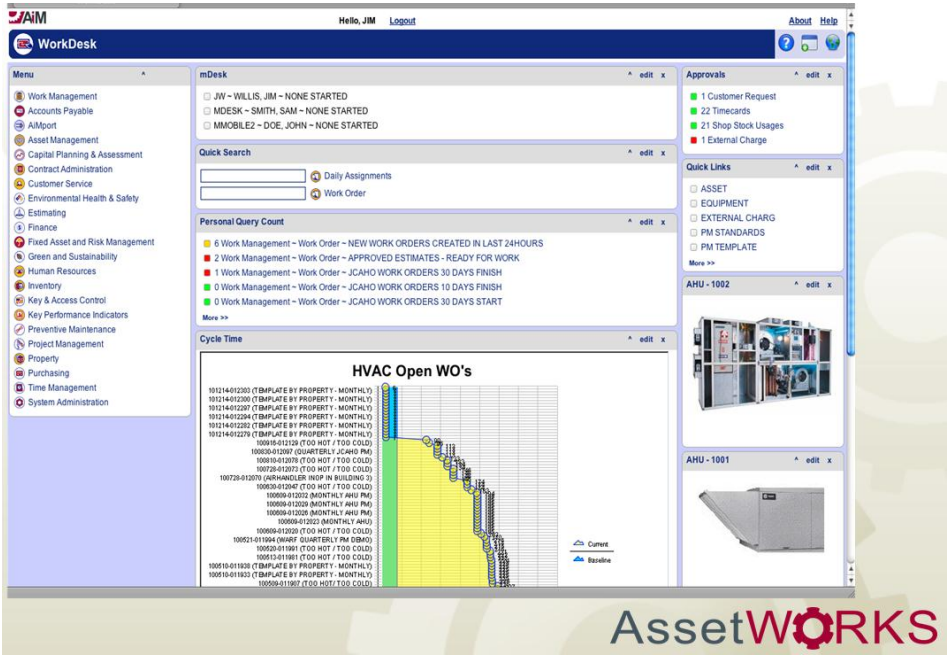
Project Context for Using COBie

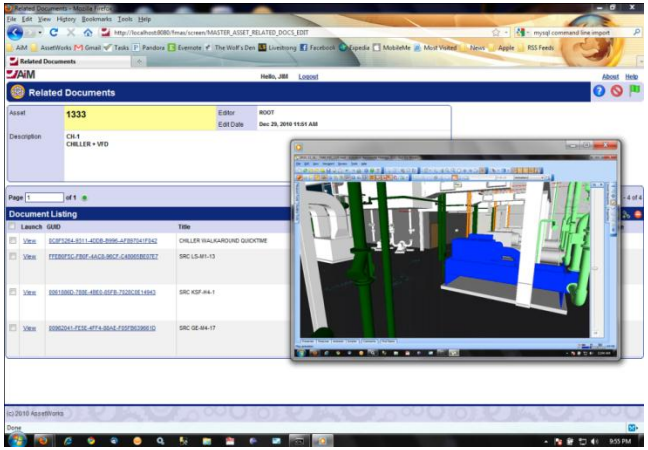
- Minimal COBie data within A/E model (2%)
- Information exchanges not structured for COBie use from design & construction deliverables
- No CMMS chosen at start
- Multiple benefits exist
- Why was COBie format chosen? ← Open Standard Format / Neutral
- How was data assembled?

The Challenge: Reduce Work Order Cycle Time

- No previous CMMS in use at enterprise level
- No BIM or COBie data standard in place

- **Needed to determine what information would reduce the typical Work Order Cycle time.**

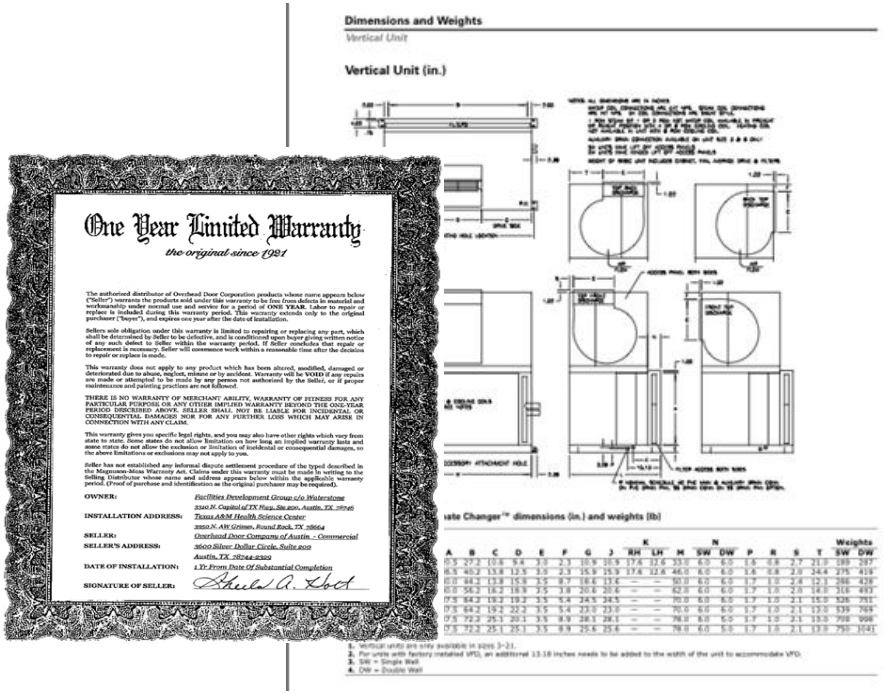




Metrics: What can be improved?

Reduction in time spent:

- Researching O&M data needed to deploy a crew to the field
- Locating the equipment (building, floor, room, within room, other)
- Access equipment warranties and other records



Dimensions and Weights

Vertical Unit

Vertical Unit (in.)

One Year Limited Warranty

the original since 1921

The authorized distributor of Overhead Door Corporation products whose name appears below ("Seller") warrants the products sold under this warranty to be free from defects in material and workmanship under normal use and service for a period of ONE YEAR. Labor to repair or replace is included during this warranty period. This warranty extends only to the original purchaser ("buyer"), and expires one year after the date of installation.

Sellers sole obligation under this warranty is limited to repairing or replacing any part, which shall be determined by Seller to be defective, and is conditioned upon buyer giving written notice of any such defect to Seller within the warranty period. If Seller concludes that repair or replacement is necessary, Seller will commence work within a reasonable time after the decision to repair or replace is made.

This warranty does not apply to any product which has been altered, modified, damaged or abused in any way, whether by accident, misuse or by accident. Warranty will be VOID if any repairs are made or attempted to be made by any person not authorized by the Seller, or if proper maintenance and painting practices are not followed.

THERE IS NO WARRANTY OF MERCHANTABILITY, WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER IMPLIED WARRANTY BEYOND THE ONE-YEAR PERIOD DESCRIBED ABOVE. SELLER SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES NOR FOR ANY FURTHER LOSS WHICH MAY ARISE IN CONNECTION WITH ANY CLAIM.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitation on how long an implied warranty lasts and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

Seller has not established any informal dispute settlement procedure of the typed described in the Magnuson-Moss Warranty Act. Any claim under this warranty must be made in writing to the selling Distributor whose name and address appears below within the applicable warranty period. (Proof of purchase and identification as the original purchaser may be required.)

OWNER: *Facilities Development Group c/o Waterstone*

INSTALLATION ADDRESS: *3340 N. Capital of TX Hwy, Ste 400, Austin, TX 78746*
Texas A&M Health Science Center
3950 N. AW Grimes, Round Rock, TX 78664

SELLER: *Overhead Door Company of Austin - Commercial*

SELLER'S ADDRESS: *3600 Silver Dollar Circle, Suite 200*
Austin, TX 78744-2300

DATE OF INSTALLATION: *1 Yr From Date Of Substantial Completion*

SIGNATURE OF SELLER:

ate Changer™ dimensions (in.) and weights (lb)

POWEREX

PURE AIR TECHNOLOGY

Industrial Vacuum Tankmount System

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

General Description

Powerex vacuum tankmount simplex/duplex units are designed to provide vacuum for process, molding, packaging, printing and other similar facilities.

Vacuum tankmount systems can be used for a variety of applications. A vacuum pump creates a suction to rid unwanted fluids or gases from the working area. Waste fluids are deposited into a customer-provided collection tank and the vapors are filtered through the system, then vented to the

Vacuum Tankmount System

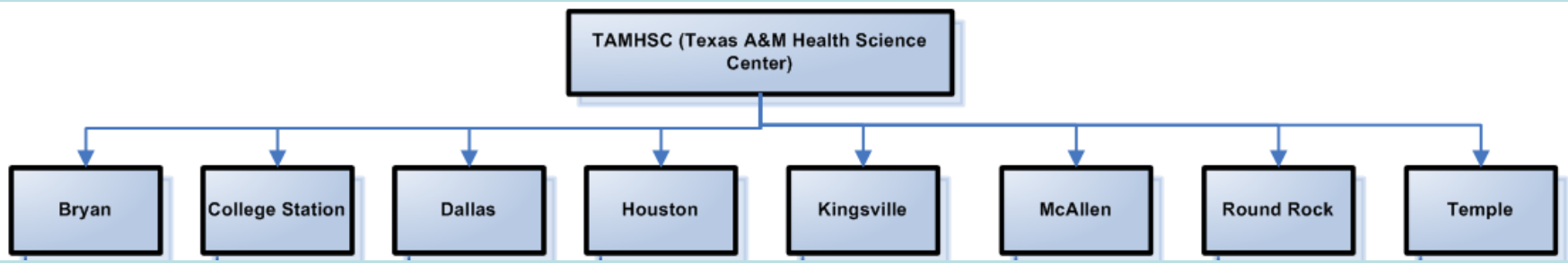
CUSTOMER WARRANTY DOCUMENT

NE INTERIOR FINISH WARRANTY

r **ten (10) years** that its textured coating, when
ne specifications and individual product data
its bond, peel or flake from the substrate over which
it is applied. The colors will be fade resistant unless otherwise specified by
PermaTone.

Process Scope: The Digitally Enabled CMMS

- TAM HSC is not necessarily changing their current processes in terms of workflow but rather data content by using the latest CMMS software along with the COBie data.
- They are re-baselining the enterprise (8 campuses) with a consistent WO process inside of the CMMS.



- They are looking at the workflow process blocks to determine what information can be provided in a digital manner (in lieu of hardcopy) to digitally enable the CMMS with value added content.

Process Scope: The Digitally Enabled CMMS

- Validate required COBie data.
- Reverse engineer the COBie POR back to a project team deliverable matrix.
- Revise contracts and deliverables that define content and format for COBie data creation.
- This will create a consistent COBie data deliverable process with repeatable benefits.

Implementation Plan:

- Allow WO process to stabilize with CMMS / TAM HSC implementation work sessions. ***Completed***

- Map COBie data fields and documents to WO flow where provision of digital data will reduce time (requirements determination). ***Completed***

- Evaluate current COBie data provisions and create reconciliation list of any missing data fields / docs (requirements alignment). ***In Process***

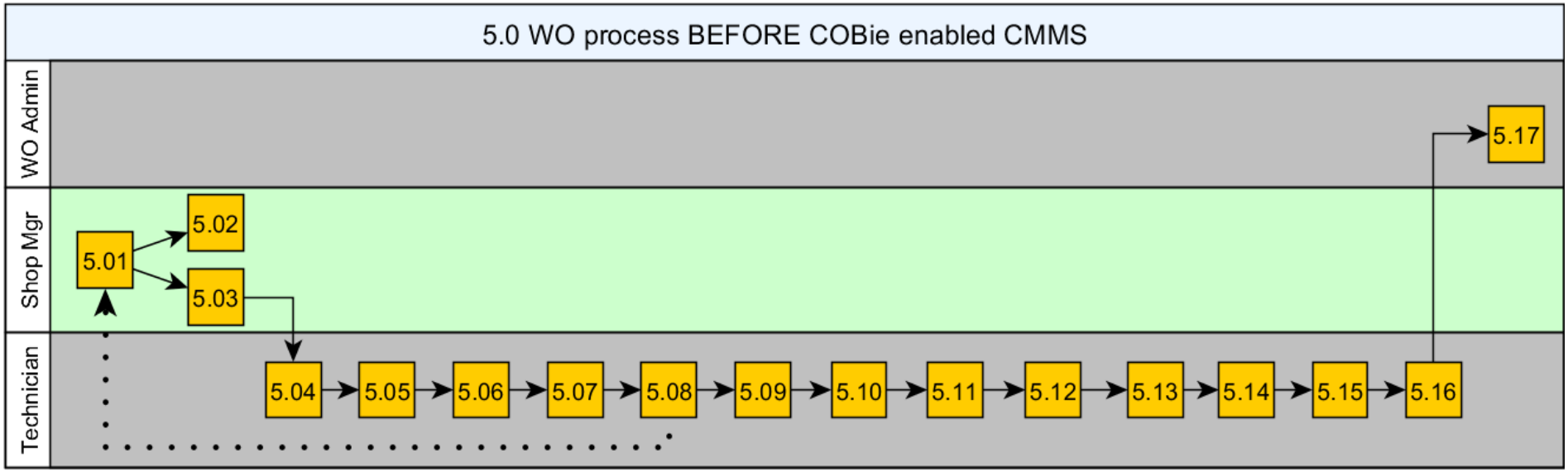
Implementation Plan:

- Estimate former WO cycle times based upon interviews with experienced Facility Managers at each campus by comparison to established flowcharts. This will establish a base case for the WO cycle times. ***Completed***

- Evaluate new WO cycle times with CMMS and fully enabled digital data / documents being available. ***Next Phase***

- Compare old cycle times to new cycle times. ***Prediction Completed***

Current Process: Work Order Cycle

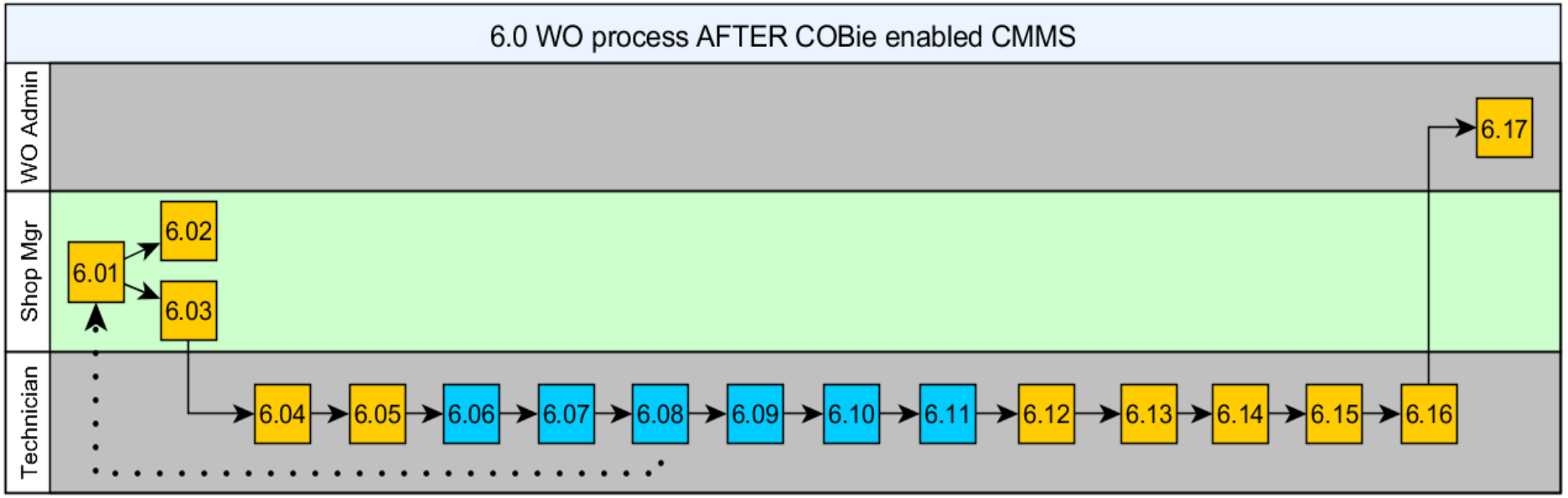


5.01 Review WO
5.02 Assign WO to Contractor
5.03 Assign WO to Technician
5.04 Review WO
5.05 Review Drawings
5.06 Find O&M Data
5.07 Reivew O&M Data
5.08 Find Warranty
5.09 Visit Equipment
5.10 Retrieve Additional Data in Field
5.11 Return to Shop
5.12 Review Product Data
5.13 Retrieve Needed Parts
5.14 Retrieve Special Tools
5.15 Visit Equipment
5.16 Perform Work
5.17 External Change Entered

Historical Durations: Work Order Activities Per O&M Staff Survey

WO process BEFORE COBie enabled CMMS		Dallas	Bryan	McAllen	
Activity ID	**Activity**	**Estimated Time (min)**	**Estimated Time (min)**	**Estimated Time (min)**	**Average Time**
5.01	Review WO	5	5	5	5
5.02	Assign WO contractor	15	12.5	16	14.5
5.03	Assign WO to technician	5	5	2	4
5.04	Review WO	5	5	2	4
5.05	Review drawings	2	11	10	7.7
5.06	Find O & M	1	3	2	2.0
5.07	Review O & M	1	5	2	2.7
5.08	Find Warranty	3	2	2	2.3
5.09	Visit equipment	1	1.25	0.75	1
5.10	Retrieve product data from equipment	0.75	1.25	1	1.0
5.11	Return to shop	0.75	1.25	1	1.0
5.12	Review product data	10	12	13	11.7
5.13	Retrieve needed parts	5	10	15	10
5.14	Retrieve special tools	3	3	2	2.7
5.15	Visit equipment	10	20	5	11.7
5.16	Perform work	45	30	60	45
5.17	External change entered	3	2	7.5	4.2
Total		115.5	129.25	146.25	130.3

New Process: Work Order Cycle
(Expected Duration Compressions in Blue)



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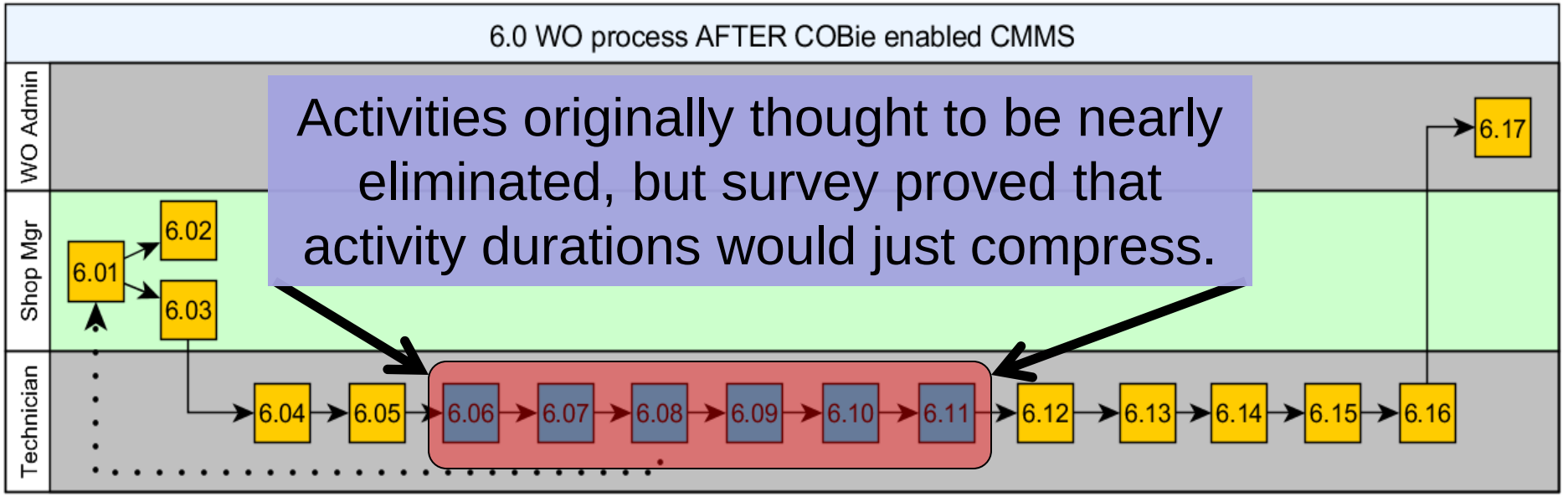

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Expected Durations: Work Order Activities per O&M Staff Survey)

WO process AFTER COBie enabled CMMS		Dallas	Bryan	McAllen	
Activity ID	**Activity**	**Estimated Time (min)**	**Estimated Time (min)**	**Estimated Time (min)**	**Average Time**
6.01	Review WO	5	5	5	5
6.02	Assign WO contractor	15	12.5	10	12.5
6.03	Assign WO to technician	5	5	2	4
6.04	Review WO	5	5	2	4
6.05	Review drawings	1.25	8.5	8.5	6.1
5.06	Find O & M	0.26	0.14	0.38	0.3
5.07	Review O & M	1	5	2	2.7
5.08	Find Warranty	0.25	0.25	0.25	0.3
5.09	Visit equipment	0.75	1.25	1	1
5.10	Retrieve product data from equipment	0.25	0.75	0.5	0.5
5.11	Return to shop	0.75	1.25	1	1.0
6.12	Review product data	8.5	7.5	8	8.00
6.13	Retrieve needed parts	5	10	15	10
6.14	Retrieve special tools	3	3	2	2.7
6.15	Visit equipment	10	20	5	11.7
6.16	Perform work	45	30	60	45
6.17	External change entered	3	2	7.5	4.2
Total		109.01	117.14	130.13	118.8

Estimated Results

	Dallas	Bryan	McAllen	Average	Details:
Total Time per WO (Min)	115.5	129.3	146.3	130.3	Average time before COBie (from interviews)
Total Time per WO (Min)	109.0	117.1	130.1	118.8	Average time after COBie (from interviews)
Total Time per WO (Min)	6.5	12.1	16.1	11.6	Average savings per WO realized by COBie data (from interviews)
SAVING per WO (MH)	0.11	0.20	0.27	0.19	Average hour savings per WO realized by use of COBie data (from interview)
TIME SAVINGS (%)	5.6%	9.4%	11.0%	8.7%	WO time savings diveded by total time per WO
Technician Count	16.00	5.00	1.00	n/a	Amount of campus technicians available for WO's
Available Hours/YR	24000	7500	1500	n/a	Technician count multiplied by actual FTE (1,500 MH)
Expected WO's/YR	13210	3842	692	n/a	Available MH's divided by total time per WO
Expected MH Savings/YR	1429	775	186	n/a	Expected WO's/YR mulitplied by MH savings per WO

Assumptions: FTE = 2,000 MH Effeciency 75%; Actual FTE = 1,500
Technicians are serving WO's full time

Conclusions to Date

- Work Order flow processes have proven to be similar across the 8 campuses through dialogue.
- Qualitative understanding that efficiencies can be improved with the availability of digital data. **(Avg. 8.7% Prediction)**
- Normalization of data to be used across the enterprise is being established and validated. ← **Key Assumption**
- Reductions in Work Order cycle times are expected at all 8 locations with consistent application of data needs.
- The CMMS implementation is an optimum time to establish normalized data expectations and prior to full data loading into the CMMS.

Questions Requiring Clarity

- 2 hours surveyed vs. 4 hours reported
  - Users consider themselves more efficient than survey results proved
- Wrench turning vs. Admin time
  - Reconcile and set time keeping rules for results quantification effort
- Are technicians logging all their time into CMMS?
- Work Order Classifications (difficulty: light, medium, hard)
  - Reactive vs. Preventative vs. Emergency
  - Break out by total and by equipment types / category

Next Step: Verify the Results

- Round Rock campus has been using CMMS with no COBie data for 90 days.
- COBie data has been collected and will be loaded into CMMS for measuring the benefit.
- Results (update) expected to be ready for next COAA Conference in Summer 2012.

COBie Case Study:

Case Study & Survey Results

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Hyde Griffith, PE, Vice President, Broaddus & Associates
hgriffith@broaddusassociates.com
Phone: 409-599-9623

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