2022 CFMA Conference

WIFI Sponsor: Rubin Brown


plante moran
Data driven fleet management…and lessons learned
Bob Tinglestad

Bob Tinglestad

Principal | Management Consulting | Business Analytics

303-846-3341 | bob.tinglestad@plantemoran.com

Bob has over 20 years of experience in the business technology with an emphasis in business analytics and data driven decision making, focused in construction and manufacturing. His specialty is helping organizations build and mature their analytics programs leveraging data management, performance management and business intelligence technologies to drive improved results. Bob holds a Bachelor of Science in management information systems from Purdue University and participates in Denver's Analytics Advisory Board.

CONSTRUCTION FINANCIAL MANAGEMENT ASSOCIATION

Agenda

- What and why
- Program review and lessons learned
- Next steps
- AEMP/CFMA Benchmarking PSA

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What and why

How you know there is a problem or need

What mix of equipment will we need to support our backlog and future work?

How reliable is my fleet, and how much emergency maintenance is being performed?

What are realistic utilization targets and associated equipment rental rates?

Are we on track for hitting equipment utilization targets for all equipment classes?

I need to know when and where mechanics are working overtime.

Someone used to push a button to get it. Now they're gone, and we think they took the button with them.

How do we compare to industry?

We've outgrown our processes, and they are too complicated to maintain.

I don't want to spend every weekend dumping cost data & PM plans into Excel.

We don't know how to get what we need.

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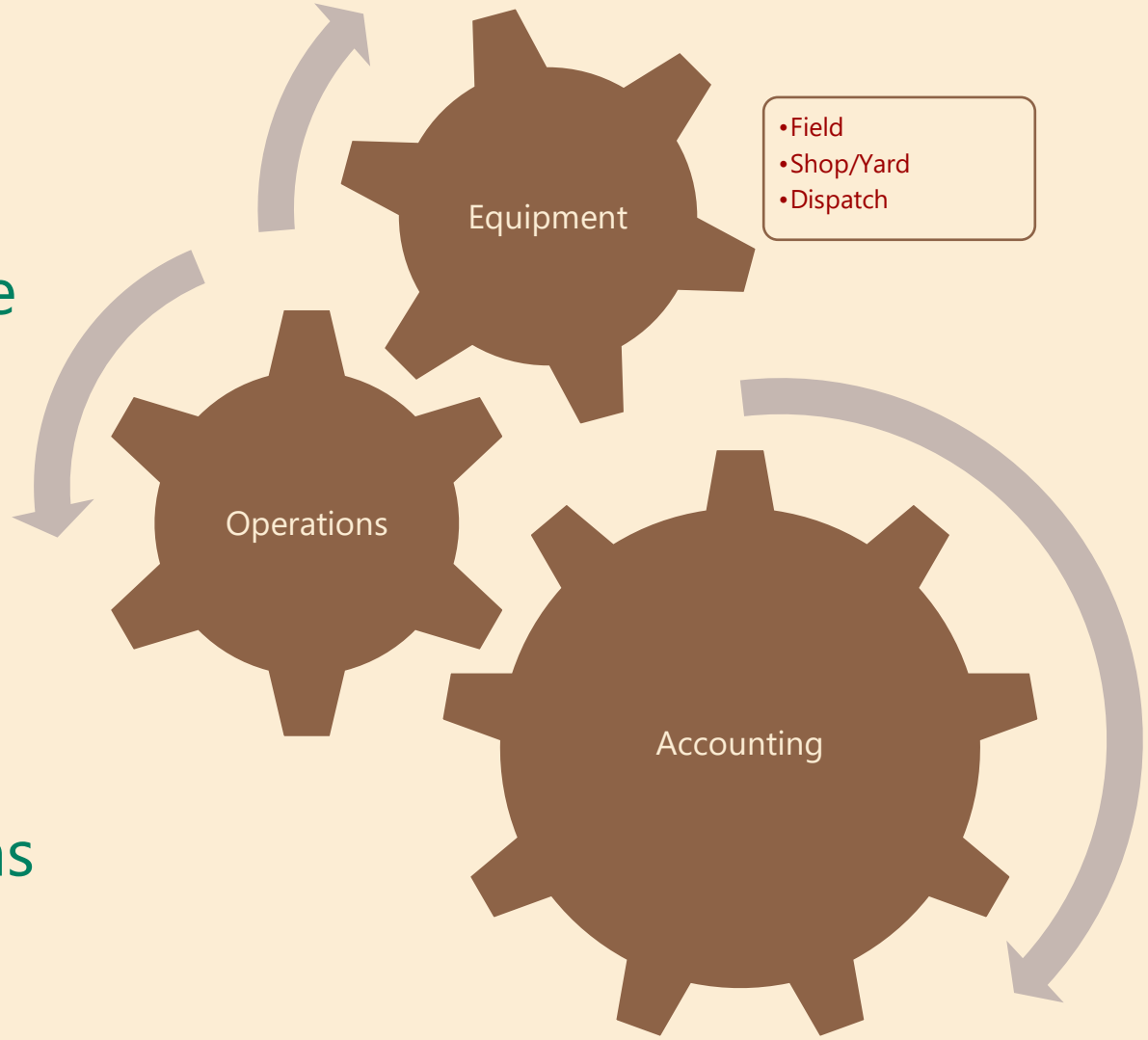
Why does this matter?

Typically ~50% of fixed assets are rolling stock (heavy highway), even higher for excavators

Equipment revenue is typically 80% of labor revenue

~35% original equipment costs as a % of annual self perform revenue



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Effective Fleet Management

- Managing the age of the fleet
- Managing equipment capacity
- Lease versus buy decisions
- Equipment maintenance
- Organizational considerations
- Production reporting
- Dispatching, tracking, GPS
- Truck ticketing/scanning
- Fuel monitoring
- Equipment cost rate modeling

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Equipment cost modeling - considerations

- Full life-cycle costing/rental rates
- Model the key drivers of ownership costs and operating costs
- What-if scenarios with utilization, maintenance intervals, shop costs, etc.
- Run versus stand-by rates
- Shop budget based on operating hours projections and key cost model drivers
- Support key fleet management decisions regarding utilization, rent vs. lease vs. own, hold/sell and maintenance practices

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Fleet Management functions

- Fleet Cost and Utilization Mgmt
- Fleet Rate Setting (including utilization targets)
- Fleet Maintenance – Shop and Job Site
- Fleet Availability and Reliability Mgmt
- Fleet Average Age Mgmt
- Fleet Buy, Borrow, Lease or Rent Mgmt

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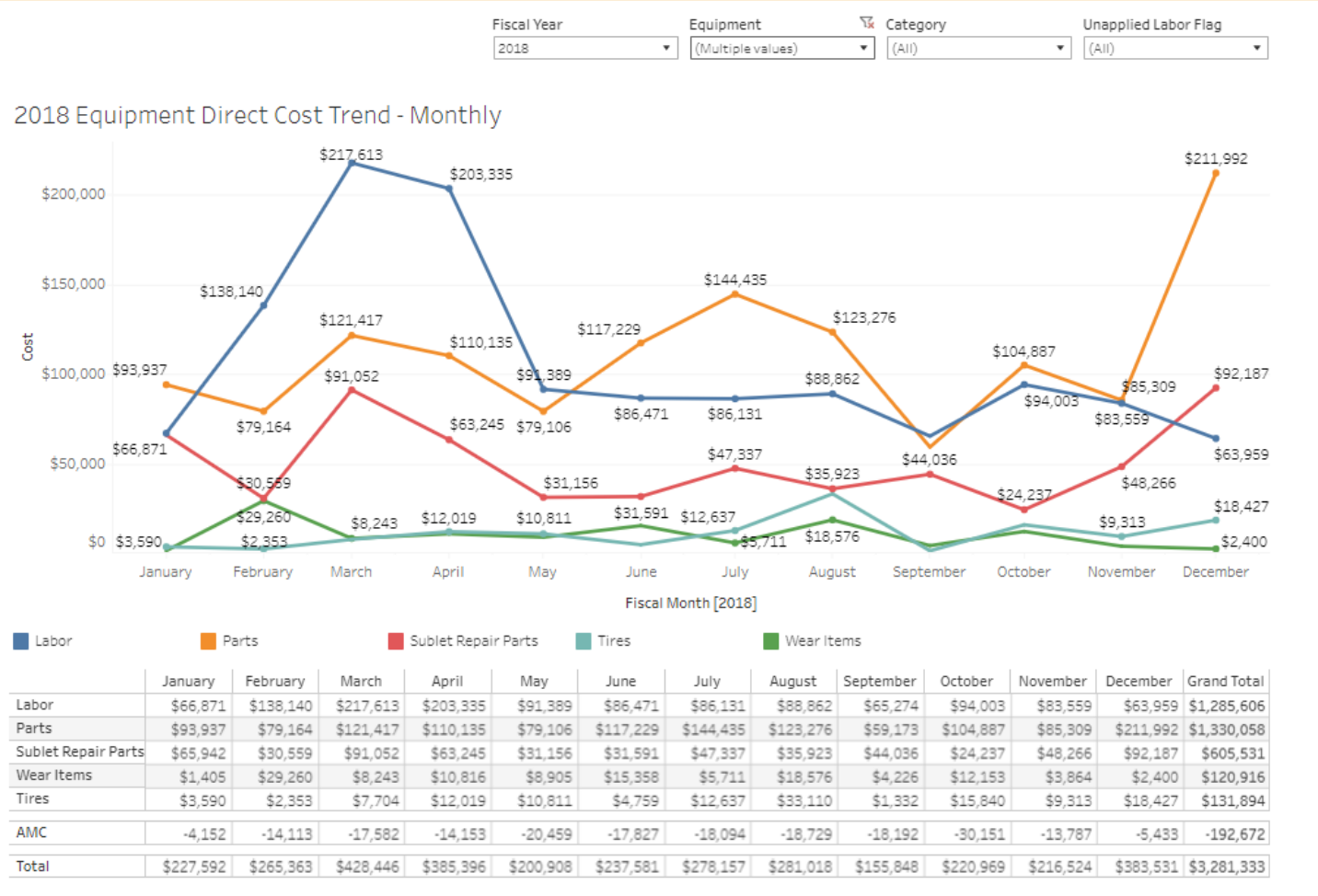
KPIs – Lagging indicators

Lagging indicator

- A result, output, outcome, $$$
- How we performed
- Past performance measurement
- Best in class behaviors



	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Labor	$66,871	$138,140	$217,613	$203,335	$91,389	$86,471	$86,131	$88,862	$65,274	$94,003	$83,559	$63,959	$1,285,606
Parts	$93,937	$79,164	$121,417	$110,135	$79,106	$117,229	$144,435	$123,276	$59,173	$104,887	$85,309	$211,992	$1,330,058
Sublet Repair Parts	$65,942	$30,559	$91,052	$63,245	$31,156	$31,591	$47,337	$35,923	$44,036	$24,237	$48,266	$92,187	$605,531
Wear Items	$1,405	$29,260	$8,243	$10,816	$8,905	$15,358	$5,711	$18,576	$4,226	$12,153	$3,864	$2,400	$120,916
Tires	$3,590	$2,353	$7,704	$12,019	$10,811	$4,759	$12,637	$33,110	$1,332	$15,840	$9,313	$18,427	$131,894
AMC	-4,152	-14,113	-17,582	-14,153	-20,459	-17,827	-18,094	-18,729	-18,192	-30,151	-13,787	-5,433	-192,672
Total	$227,592	$265,363	$428,446	$385,396	$200,908	$237,581	$278,157	$281,018	$155,848	$220,969	$216,524	$383,531	$3,281,333

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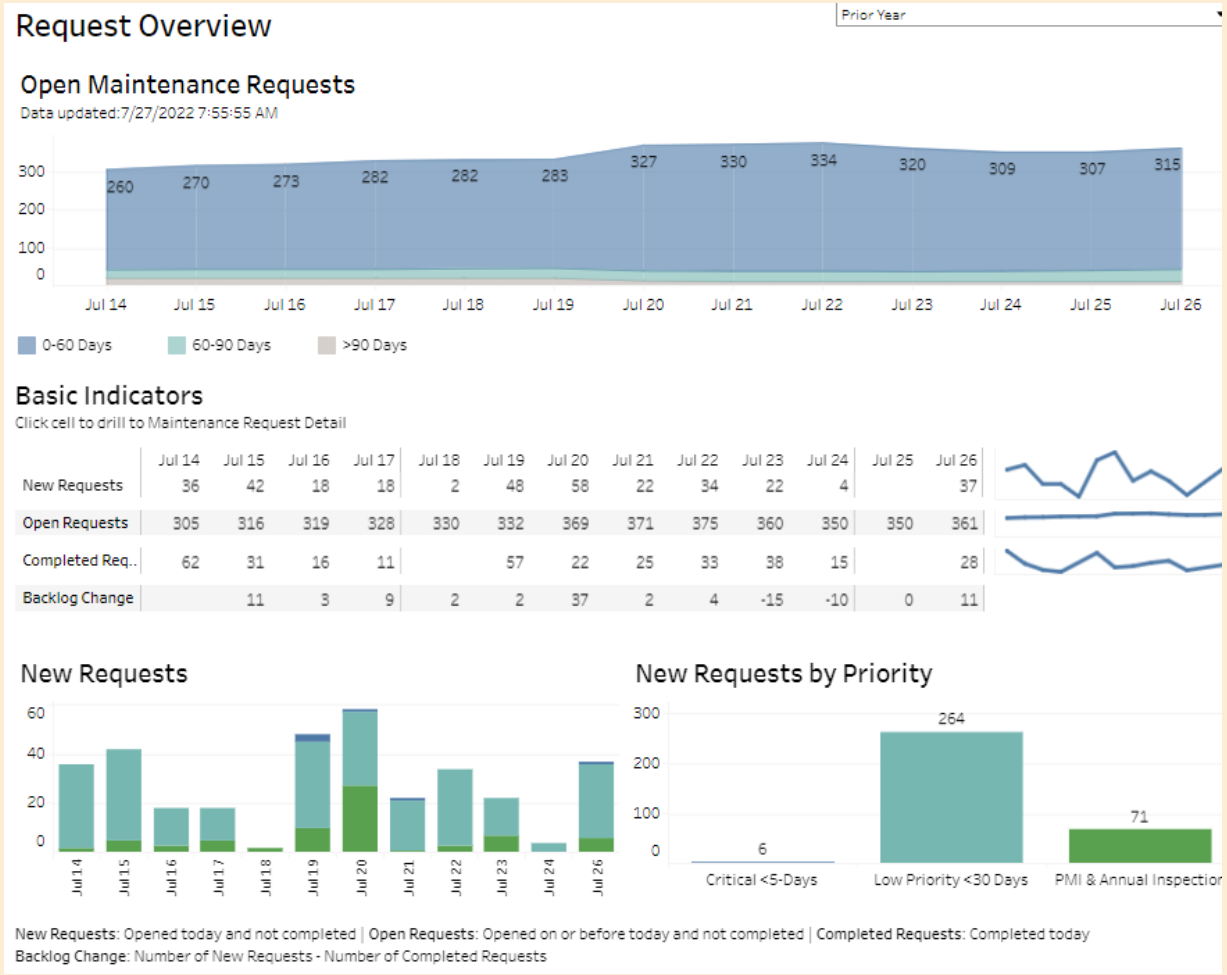
KPIs – Leading indicators

Leading indicator

- Drivers
- How we think we'll perform
- Future performance predictor
- Activities, inputs, verbs
- Best in class behaviors



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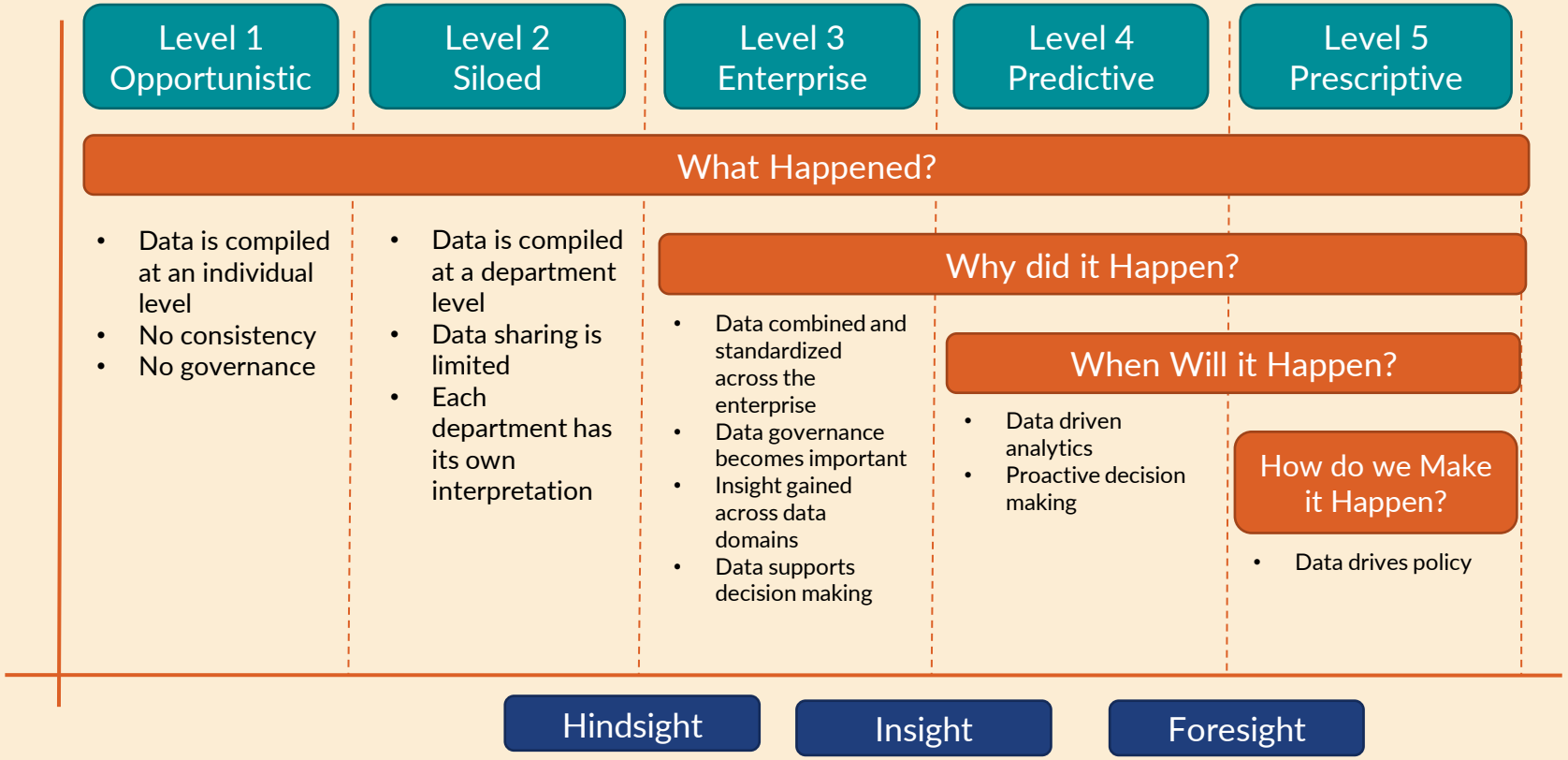
Program review and lessons learned

Analytics Stages of Maturity



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Equipment data before

EM Meter Readings History w/ Department

All Equipment | **Deparment: 30 - 30** | **Meter Reading Dates: 01/01/20 - 12/31/20**

Reading	Mth	Trans	Batch	Posted	Source	Hour Meter Previous / Current	Total Hr Meters Previous / Current	Hours	Odometer Previous / Current	Total Odometer Previous / Current	Miles
1540		**Jeep Grand Cherokee - Shop Loaner**								**Dept: 30**	
									140,500.00	140,500.00	
05/01/20	05/20	112	177	05/06/20	Meter	1.00	1.00	0.00	144,450.00	144,450.00	3,950.00
06/29/20	06/20	1,480	3,919	07/08/20	Meter	1.00	1.00	0.00	145,999.00	145,999.00	1,549.00
12/14/20	12/20	1,708	3,210	01/19/21	Meter	1.00	1.00	0.00	109,443.00	109,443.00	-36,556.00
1541		**Jeep Grand Cherokee**								**Dept: 30**	
						2,581.00	2,581.00		143,384.00	143,384.00	
01/08/20	01/20	456	1,833	01/24/20	Meter	2,635.00	2,635.00	54.00	145,192.00	145,192.00	1,808.00
01/15/20	01/20	657	1,838	01/24/20	Meter	2,654.00	2,654.00	19.00	145,910.00	145,910.00	718.00
01/25/20	01/20	850	1,936	01/27/20	Meter	2,688.00	2,688.00	34.00	147,079.00	147,079.00	1,169.00
01/30/20	01/20	1,122	3,273	02/06/20	Meter	2,702.00	2,702.00	14.00	147,634.00	147,634.00	555.00
02/05/20	02/20	129	314	02/11/20	Meter	2,719.00	2,719.00	17.00	148,136.00	148,136.00	502.00
02/14/20	02/20	333	700	02/17/20	Meter	2,745.00	2,745.00	26.00	148,884.00	148,884.00	748.00
02/17/20	02/20	652	2,305	03/04/20	Meter	2,753.00	2,753.00	8.00	149,162.00	149,162.00	278.00
02/27/20	02/20	804	2,318	03/04/20	Meter	2,780.00	2,780.00	27.00	150,138.00	150,138.00	976.00
03/07/20	03/20	88	686	03/11/20	Meter	2,804.00	2,804.00	24.00	150,928.00	150,928.00	790.00
03/11/20	03/20	458	1,588	03/23/20	Meter	2,820.00	2,820.00	16.00	151,521.00	151,521.00	593.00
03/18/20	03/20	664	1,593	03/23/20	Meter	2,839.00	2,839.00	19.00	152,257.00	152,257.00	736.00

Report 1

EM Revenue Detail Report with GL Detail

By Equipment

All JCCos | **All Jobs** | **Department(s): 10 - 96**

All Equipment | **Months: 01/20 - 12/20** | **Categories: S - 958**

Trans	Source	Revenue Code	Posted Date	Actual Date	Trans Type	EM Co	C=Customer #/Name, I=INCo/Loc J=Job/Phs/Ct, E=UsedonEq/CC/Ct W=UsedonEq/CC/Ct, X=GL Exp	Emp	Time Units	Revenue Rate	Dollars	GL Offset	Equip	Cat
Equipment:		**1540 Jeep Grand Cherokee - Shop Loaner**								- Continued				
1256	PR	H	09/15/20	09/15/20	J	1	30-/460050- 00/4	38943	21.670	30.00	650.10	4300-1300-	1540	151
3331	PR	H	09/30/20	09/30/20	J	1	30-/460050- 00/4	38943	21.670	30.00	650.10	4300-1300-	1540	151
							Month: 09/20		**43.340**		**1,300.20**			
2023	PR	H	10/15/20	10/15/20	J	1	30-/460050- 00/4	38943	21.670	30.00	650.10	4300-1300-	1540	151
3872	PR	H	10/29/20	10/31/20	J	1	30-/460050- 00/4	38943	21.670	30.00	650.10	4300-1300-	1540	151
							Month: 10/20		**43.340**		**1,300.20**			
1855	PR	H	11/17/20	11/15/20	J	1	30-/460050- 00/4	38943	21.670	30.00	650.10	4300-1300-	1540	151
2968	PR	H	11/25/20	11/30/20	J	1	30-/460050- 00/4	38943	21.670	30.00	650.10	4300-1300-	1540	151
							Month: 11/20		**43.340**		**1,300.20**			
933	PR	H	12/14/20	12/15/20	J	1	30-/460050- 00/4	38943	21.670	30.00	650.10	4300-1300-	1540	151
1563	PR	H	12/31/20	12/31/20	J	1	30-/460050- 00/4	38943	21.670	30.00	650.10	4300-1300-	1540	151
							Month: 12/20		**43.340**		**1,300.20**			
							Total For Equipment 1540:		**520.080**		**15,602.40**			
Equipment:		**1541 Jeep Grand Cherokee**												
635	PR	H	01/16/20	01/15/20	J	1	30-/800404- 00/4	8978	21.670	30.00	650.10	4300-1300-	1541	151
1791	PR	H	01/30/20	01/31/20	J	1	30-/800404- 00/4	8978	21.670	30.00	650.10	4300-1300-	1541	151
							Month: 01/20		**43.340**		**1,300.20**			
466	PR	H	02/13/20	02/15/20	J	1	30-/800404- 00/4	8978	21.670	30.00	650.10	4300-1300-	1541	151
1028	PR	H	02/28/20	02/29/20	J	1	30-/800404- 00/4	8978	21.670	30.00	650.10	4300-1300-	1541	151
							Month: 02/20		**43.340**		**1,300.20**			

Report 2 with details

CONSTRUCTION FINANCIAL MANAGEMENT ASSOCIATION

Equipment data before

EM Monthly Cost and Revenue Drilldown - BC (Sort Order = C)

ıtegories: All Equipment 403 - 403 | Departments: 30 - 30 | Company: 1-BSG | Status: Active | Months: 01/20 - 12/20

		Usage Hours	Usage Rev	Cost	Profit
403	Pavers	6,389.00	843,348.00	912,406.20	-69,058.20
40323	Volvo Paver P7110	1,137.50	150,150.00	209,488.26	-59,338.26
40324	Volvo Paver P7110	1,087.50	143,550.00	144,875.92	-1,325.92
40325	Volvo Paver P7110	1,411.00	186,252.00	196,932.30	-10,680.30
40326	Volvo Paver P7110	1,176.50	155,298.00	142,205.05	13,092.95
40327	Volvo Paver P7110	789.50	104,214.00	173,065.28	-68,851.28
40328	Volvo Paver P7110	787.00	103,884.00	45,839.39	58,044.61

Report 3 with details

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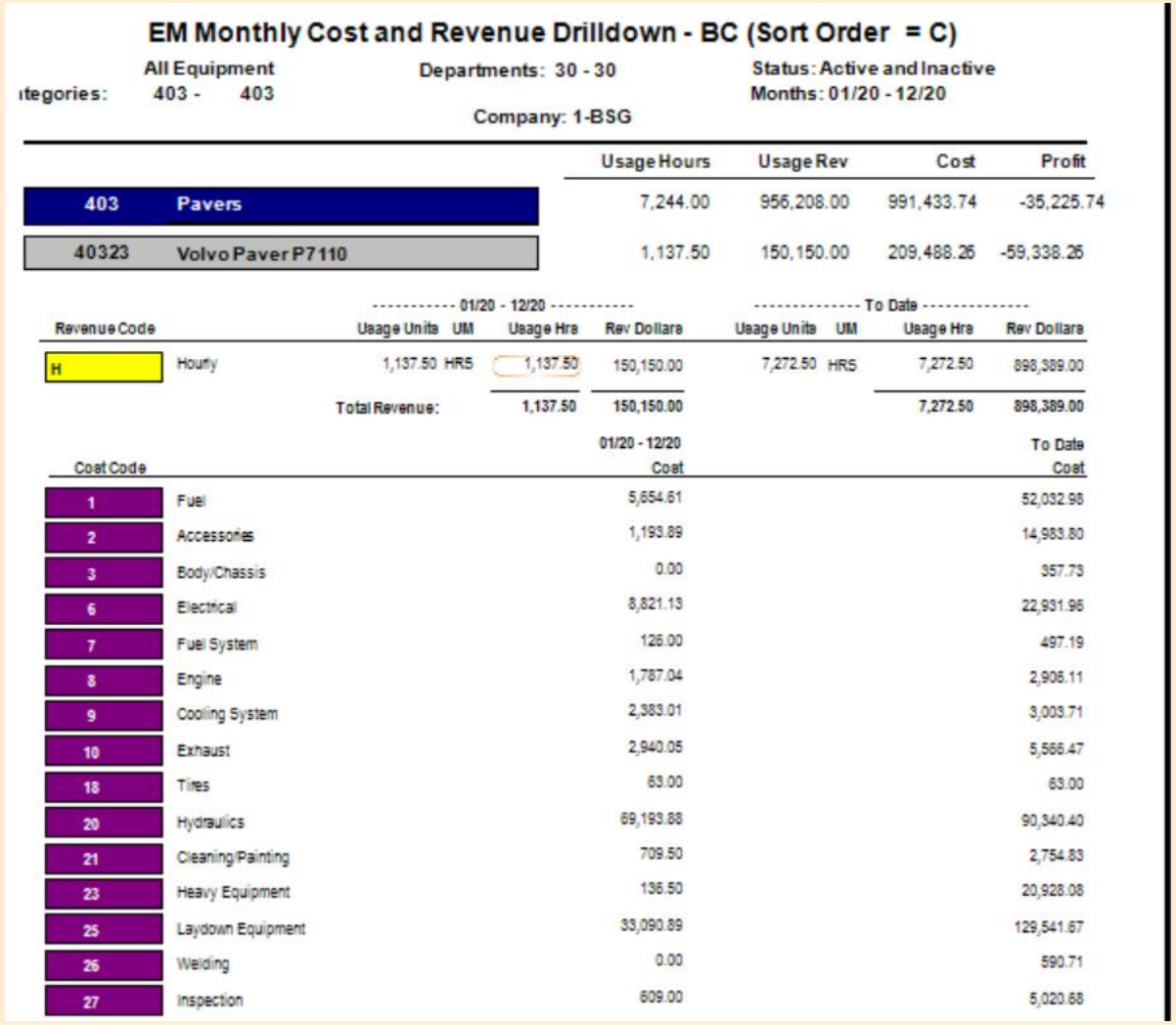
Equipment data before



EM Monthly Cost and Revenue Drilldown - BC (Sort Order = C)

ıtegories: All Equipment 403 - 403 | Departments: 30 - 30 | Company: 1-BSG | Status: Active and Inactive | Months: 01/20 - 12/20

		Usage Hours	Usage Rev	Cost	Profit
403	Pavers	7,244.00	956,208.00	991,433.74	-35,225.74
40323	Volvo Paver P7110	1,137.50	150,150.00	209,488.26	-59,338.26

		01/20 - 12/20				To Date			
Revenue Code		Usage Units	UM	Usage Hrs	Rev Dollars	Usage Units	UM	Usage Hrs	Rev Dollars
H	Hourly	1,137.50	HRS	1,137.50	150,150.00	7,272.50	HRS	7,272.50	898,389.00
	Total Revenue:			1,137.50	150,150.00			7,272.50	898,389.00

Cost Code		01/20 - 12/20 Cost	To Date Cost
1	Fuel	5,654.61	52,032.98
2	Accessories	1,193.89	14,983.80
3	Body/Chassis	0.00	357.73
6	Electrical	8,821.13	22,931.96
7	Fuel System	126.00	497.19
8	Engine	1,787.04	2,906.11
9	Cooling System	2,383.01	3,003.71
10	Exhaust	2,940.05	5,566.47
18	Tires	63.00	63.00
20	Hydraulics	69,193.88	90,340.40
21	Cleaning/Painting	709.50	2,754.83
23	Heavy Equipment	136.50	20,928.08
25	Laydown Equipment	33,090.89	129,541.67
26	Welding	0.00	590.71
27	Inspection	609.00	5,020.68

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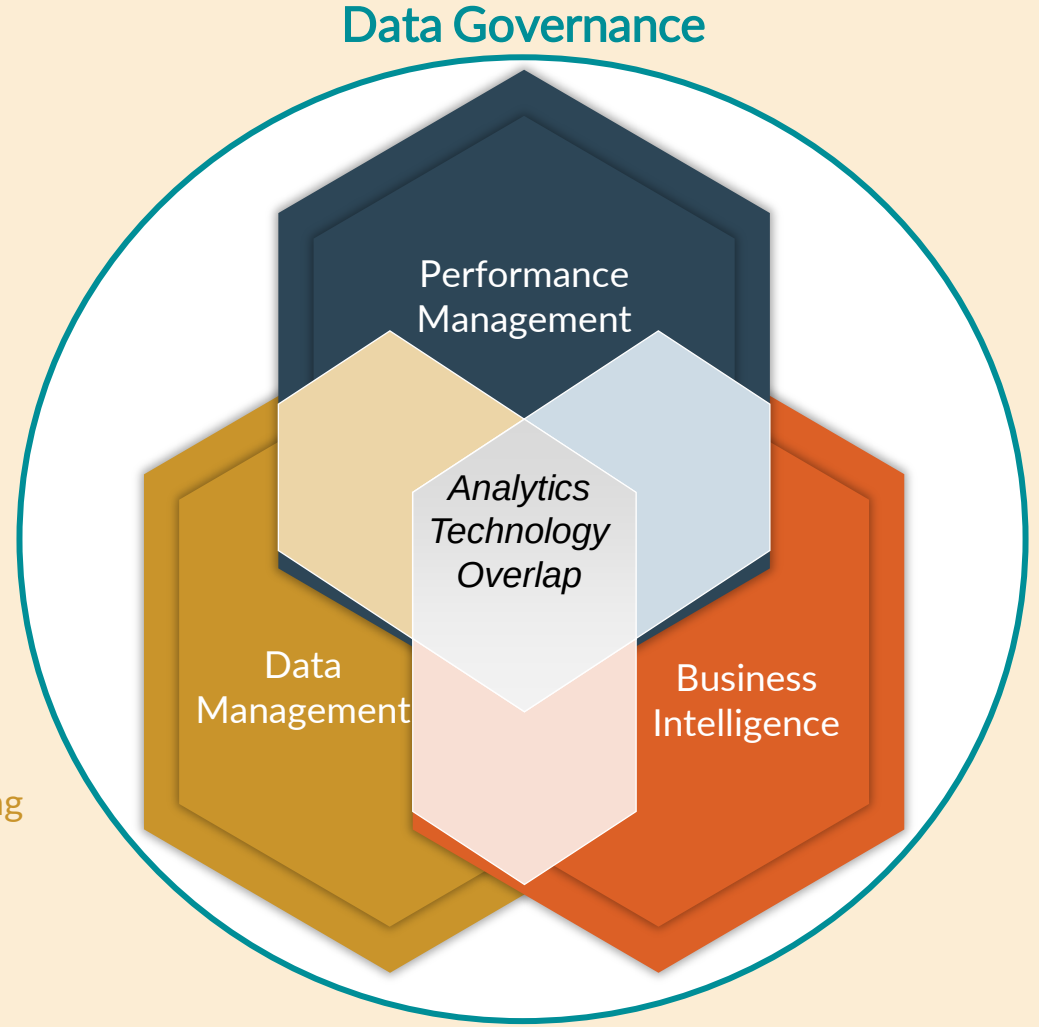
Report 4

Enterprise Analytics Technology

Data Governance Technology
- Master data management
- Data Dictionary
- Managing Business Rules & Meta-Data Layer



Performance Management Technology
- Financial planning & budgeting
- Variance reporting
- Financial forecasting
- Revenue, Sales, Labor, Capex forecasting
- Scenario modeling
- What-if analysis
- Workflows and approvals

Data Management Technology
- Data Integration
- Data Staging and Warehousing
- Speed & Performance aligned with user needs.

Business Intelligence Technology
- End user reporting (“Managed”)
- Dimensional reporting and filtering (“Adhoc”)
- Visualizations
- Drill-downs

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Before it all comes together

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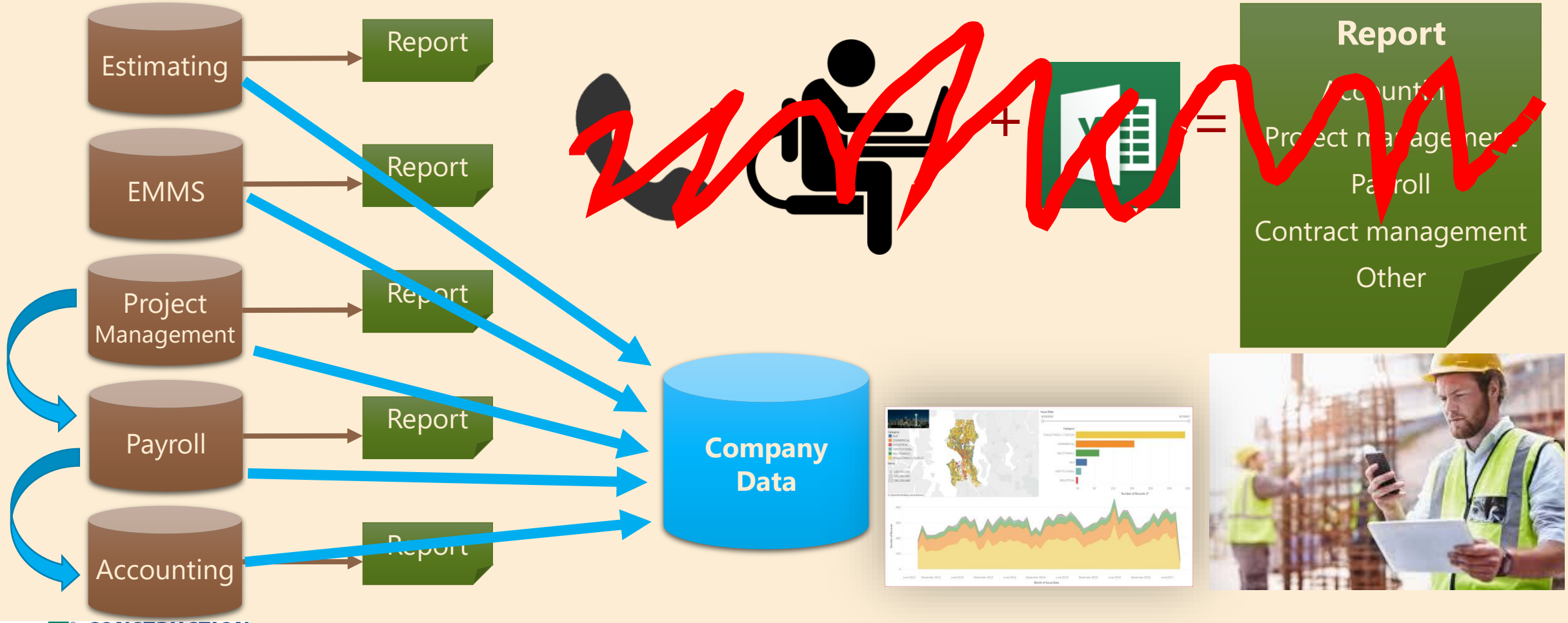
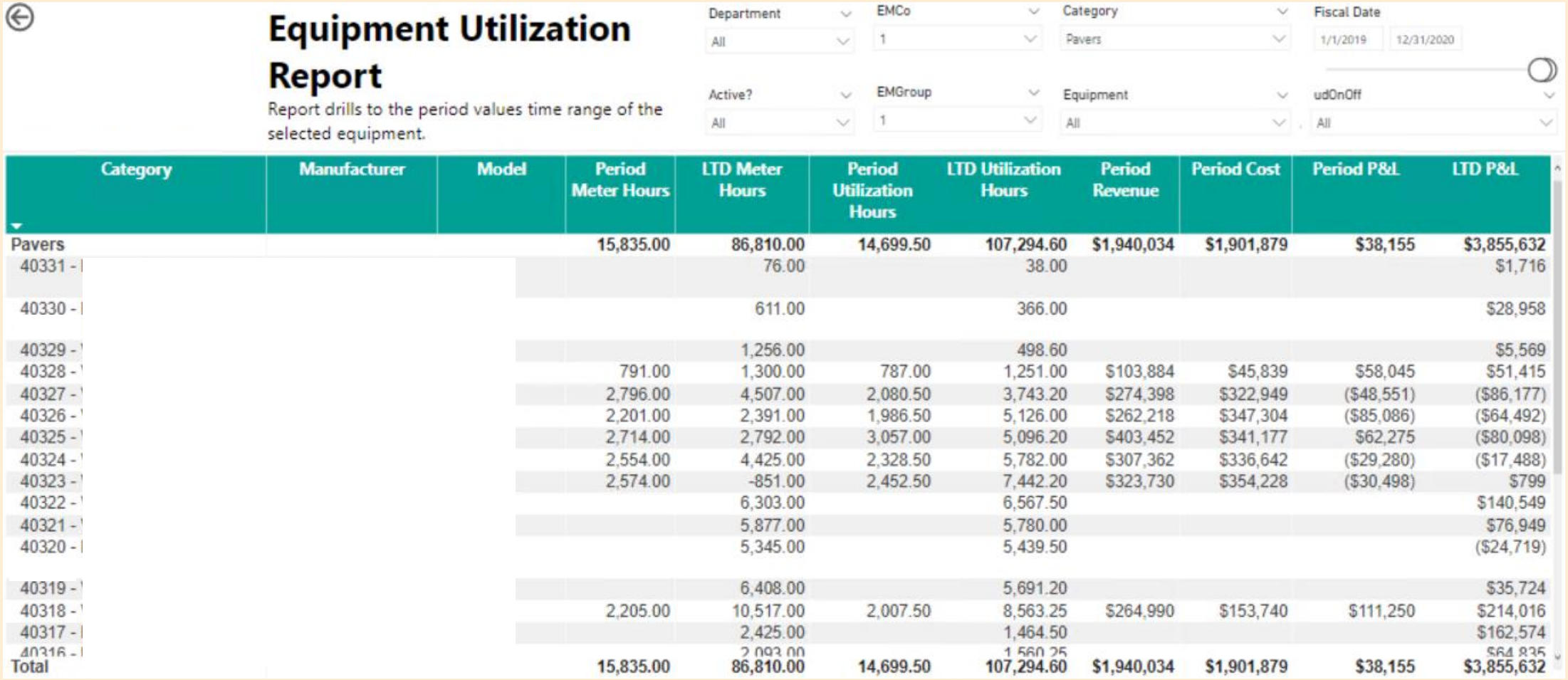
After Business Analytics solution is implemented



CONSTRUCTION FINANCIAL MANAGEMENT ASSOCIATION

Equipment utilization report after



Equipment Utilization Report

Report drills to the period values time range of the selected equipment.

Department: All | EMCo: 1 | Category: Pavers | Fiscal Date: 1/1/2019 – 12/31/2020

Active?: All | EMGroup: 1 | Equipment: All | udOnOff: All

Category	Manufacturer	Model	Period Meter Hours	LTD Meter Hours	Period Utilization Hours	LTD Utilization Hours	Period Revenue	Period Cost	Period P&L	LTD P&L
Pavers			15,835.00	86,810.00	14,699.50	107,294.60	$1,940,034	$1,901,879	$38,155	$3,855,632
40331 -				76.00		38.00				$1,716
40330 -				611.00		366.00				$28,958
40329 -				1,256.00		498.60				$5,569
40328 -			791.00	1,300.00	787.00	1,251.00	$103,884	$45,839	$58,045	$51,415
40327 -			2,796.00	4,507.00	2,080.50	3,743.20	$274,398	$322,949	($48,551)	($86,177)
40326 -			2,201.00	2,391.00	1,986.50	5,126.00	$262,218	$347,304	($85,086)	($64,492)
40325 -			2,714.00	2,792.00	3,057.00	5,096.20	$403,452	$341,177	$62,275	($80,098)
40324 -			2,554.00	4,425.00	2,328.50	5,782.00	$307,362	$336,642	($29,280)	($17,488)
40323 -			2,574.00	-851.00	2,452.50	7,442.20	$323,730	$354,228	($30,498)	$799
40322 -				6,303.00		6,567.50				$140,549
40321 -				5,877.00		5,780.00				$76,949
40320 -				5,345.00		5,439.50				($24,719)
40319 -				6,408.00		5,691.20				$35,724
40318 -			2,205.00	10,517.00	2,007.50	8,563.25	$264,990	$153,740	$111,250	$214,016
40317 -				2,425.00		1,464.50				$162,574
40316 -				2,093.00		1,560.25				$64,835
Total			15,835.00	86,810.00	14,699.50	107,294.60	$1,940,034	$1,901,879	$38,155	$3,855,632

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Equipment data after

Meter Reading Drillthrough

40325 from 1/7/2020 to 12/8/2020

Actual Date	Posted Date	Fiscal Date	Meter Hours	Current Hour Meter
1/7/2020	1/24/2020	1/1/2020	474.00	3,710.00
1/22/2020	1/27/2020	1/1/2020	11.00	3,727.00
1/16/2020	2/10/2020	2/1/2020	6.00	3,716.00
2/14/2020	2/17/2020	2/1/2020	34.00	3,761.00
2/21/2020	3/4/2020	2/1/2020	0.00	3,761.00
2/28/2020	3/4/2020	2/1/2020	0.00	3,761.00
3/7/2020	3/11/2020	3/1/2020	0.00	3,761.00
3/13/2020	3/23/2020	3/1/2020	0.00	3,761.00
3/21/2020	3/23/2020	3/1/2020	3.00	3,764.00
3/28/2020	4/7/2020	3/1/2020	5.00	3,769.00
3/31/2020	4/7/2020	3/1/2020	0.00	3,769.00
4/6/2020	4/15/2020	4/1/2020	7.00	3,776.00
4/22/2020	5/6/2020	4/1/2020	8.00	3,784.00
5/6/2020	5/15/2020	5/1/2020	46.00	3,830.00
5/21/2020	6/10/2020	5/1/2020	106.00	3,936.00
5/30/2020	6/10/2020	5/1/2020	59.00	3,995.00
6/5/2020	6/10/2020	6/1/2020	40.00	4,035.00
6/13/2020	6/17/2020	6/1/2020	56.00	4,091.00
6/18/2020	7/7/2020	6/1/2020	33.00	4,124.00
Total			1,972.00	

Report 1 drill 1

Utilization Hours Drillthrough

udOnOff: All | Department: All | EMCo: 1 | Active?: All | EMGroup: 1

40325 - from 1/7/2020 to 12/9/2020

Actual Date	Posted Date	Fiscal Date	Transaction Number	Utilization Hours	UM	Revenue Rate	Revenue	Memo
1/7/2020	1/8/2020	1/1/2020	250	3.00		132.00	$396	
1/8/2020	1/9/2020	1/1/2020	392	6.00		132.00	$792	
1/20/2020	1/21/2020	1/1/2020	1141	7.00		132.00	$924	
1/21/2020	1/22/2020	1/1/2020	1213	6.00		132.00	$792	
1/22/2020	1/23/2020	1/1/2020	1399	6.00		132.00	$792	
1/24/2020	1/27/2020	1/1/2020	1567	7.00		132.00	$924	
3/26/2020	3/31/2020	3/1/2020	1365	4.00		132.00	$528	
4/1/2020	4/6/2020	4/1/2020	248	4.00		132.00	$528	
4/3/2020	4/6/2020	4/1/2020	281	5.00		132.00	$660	
4/9/2020	4/10/2020	4/1/2020	783	8.00		132.00	$1,056	
4/11/2020	4/13/2020	4/1/2020	929	8.00		132.00	$1,056	
4/21/2020	4/22/2020	4/1/2020	1589	7.00		132.00	$924	
4/22/2020	4/23/2020	4/1/2020	1698	6.00		132.00	$792	
5/1/2020	5/4/2020	5/1/2020	552	9.00		132.00	$1,188	
5/2/2020	5/4/2020	5/1/2020	553	9.00		132.00	$1,188	
5/4/2020	5/5/2020	5/1/2020	769	4.00		132.00	$528	
5/7/2020	5/10/2020	5/1/2020	1317	10.00		132.00	$1,320	
5/9/2020	5/11/2020	5/1/2020	1565	11.00		132.00	$1,452	
5/11/2020	5/13/2020	5/1/2020	1885	10.00		132.00	$1,320	
5/12/2020	5/14/2020	5/1/2020	2166	10.00		132.00	$1,320	
Total				1,411.00			$186,252	

Report 1 drill 2

CONSTRUCTION FINANCIAL MANAGEMENT ASSOCIATION

Equipment data after

Cost Detail Drillthrough

40325 from 1/4/2019 to 12/31/2020

udOnOff: All | Department: All | EMCo: 1 | Active?: All | EMGroup: 1

Actual Date	Posted Date	Fiscal Date	Employee	Cost Type	Cost Code	Cost Units	UM	Cost
1/4/2019	1/29/2019	1/1/2019		Equipment/Vehicle Leases	Equip/Vehicle Leases	0.00	LS	$7,465
1/25/2019	1/29/2019	1/1/2019		Labor	Laydown Equipment	1.00	HRS	$52
1/25/2019	1/29/2019	1/1/2019		Labor	Travel - Internal	1.00	HRS	$50
1/25/2019	1/29/2019	1/1/2019		Labor	Travel - Internal	0.50	HRS	$38
1/30/2019	2/12/2019	1/1/2019		Fuel-Diesel	Fuel	171.00	GAL	$351
1/31/2019	2/20/2019	1/1/2019		Insurance	Insurance	0.00	LS	$88
2/1/2019	3/7/2019	2/1/2019		Fuel-Diesel	Fuel	45.00	GAL	$92
2/4/2019	2/23/2019	2/1/2019		Equipment/Vehicle Leases	Equip/Vehicle Leases	0.00	LS	$7,465
2/5/2019	2/11/2019	2/1/2019		Labor	Heavy Equipment	2.50	HRS	$100
2/5/2019	2/13/2019	2/1/2019		Labor	Heavy Equipment	0.00	HRS	$30
2/5/2019	2/11/2019	2/1/2019		Labor	Heavy Equipment	2.00	HRS	$60
2/5/2019	2/13/2019	2/1/2019		Labor	Heavy Equipment	0.00	HRS	$17
2/5/2019	2/11/2019	2/1/2019		Labor	Laydown Equipment	3.00	HRS	$90
2/5/2019	2/13/2019	2/1/2019		Labor	Laydown Equipment	0.00	HRS	$25
2/6/2019	2/11/2019	2/1/2019		Labor	Laydown Equipment	3.00	HRS	$120
2/6/2019	2/13/2019	2/1/2019		Labor	Laydown Equipment	0.00	HRS	$36
2/6/2019	2/11/2019	2/1/2019		Labor	Laydown Equipment	3.50	HRS	$105
2/6/2019	2/13/2019	2/1/2019		Labor	Laydown Equipment	0.00	HRS	$30
2/7/2019	2/11/2019	2/1/2019		Labor	Heavy Equipment	2.00	HRS	$80
2/7/2019	2/13/2019	2/1/2019		Labor	Heavy Equipment	0.00	HRS	$24
Total						**13,070.45**		**$341,177**

Report 1 drill 3

Cost by Cost Type Drillthrough

40325 - from 1/4/2019 to 12/31/2020

udOnOff: All | Department: All | EMCo: 1 | Active?: All | EMGroup: 1

Cost Type	Cost Units	Cost
Equipment/Vehicle Leases	**0.00**	**$180,249**
Equip/Vehicle Leases	0.00	$180,249
Fuel-Diesel	**11,841.70**	**$19,621**
Fuel	11,841.70	$19,621
Insurance	**0.00**	**$2,056**
Insurance	0.00	$2,056
Labor	**886.25**	**$39,786**
Accessories	17.00	$775
Accident	4.50	$189
Cleaning/Painting	38.50	$1,291
Electrical	81.25	$3,670
Engine	3.00	$126
Engine - PM	6.25	$286
Exhaust	4.00	$204
Fuel System	1.50	$72
Heavy Equipment	24.50	$1,145
Hudraulics - PM	6.75	$306
Hydraulics	65.50	$2,904
Inspection	42.25	$1,822
Inspection - PM	6.75	$302
Laydown Equipment	361.75	$16,241
Total	**13,070.45**	**$341,177**

Report 1 drill 4

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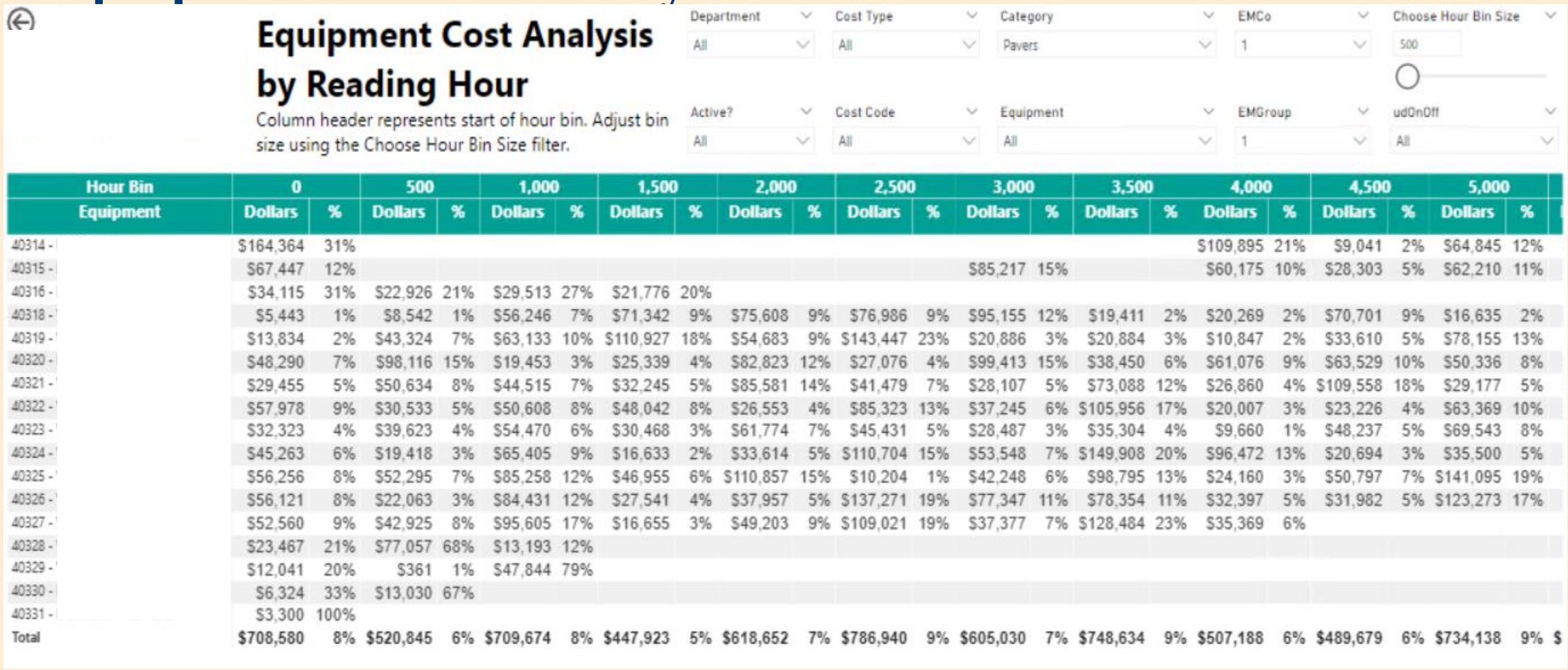
Equipment cost analysis after



Equipment Cost Analysis by Reading Hour

Column header represents start of hour bin. Adjust bin size using the Choose Hour Bin Size filter.

Department: All | Cost Type: All | Category: Pavers | EMCo: 1 | Choose Hour Bin Size: 500

Active?: All | Cost Code: All | Equipment: All | EMGroup: 1 | udOnOff: All

Hour Bin	0		500		1,000		1,500		2,000		2,500		3,000		3,500		4,000		4,500		5,000		
Equipment	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	
40314 -	$164,364	31%															$109,895	21%	$9,041	2%	$64,845	12%	
40315 -	$67,447	12%											$85,217	15%			$60,175	10%	$28,303	5%	$62,210	11%	
40316 -	$34,115	31%	$22,926	21%	$29,513	27%	$21,776	20%															
40318 -	$5,443	1%	$8,542	1%	$56,246	7%	$71,342	9%	$75,608	9%	$76,986	9%	$95,155	12%	$19,411	2%	$20,269	2%	$70,701	9%	$16,635	2%	
40319 -	$13,834	2%	$43,324	7%	$63,133	10%	$110,927	18%	$54,683	9%	$143,447	23%	$20,886	3%	$20,884	3%	$10,847	2%	$33,610	5%	$78,155	13%	
40320 -	$48,290	7%	$98,116	15%	$19,453	3%	$25,339	4%	$82,823	12%	$27,076	4%	$99,413	15%	$38,450	6%	$61,076	9%	$63,529	10%	$50,336	8%	
40321 -	$29,455	5%	$50,634	8%	$44,515	7%	$32,245	5%	$85,581	14%	$41,479	7%	$28,107	5%	$73,088	12%	$26,860	4%	$109,558	18%	$29,177	5%	
40322 -	$57,978	9%	$30,533	5%	$50,608	8%	$48,042	8%	$26,553	4%	$85,323	13%	$37,245	6%	$105,956	17%	$20,007	3%	$23,226	4%	$63,369	10%	
40323 -	$32,323	4%	$39,623	4%	$54,470	6%	$30,468	3%	$61,774	7%	$45,431	5%	$28,487	3%	$35,304	4%	$9,660	1%	$48,237	5%	$69,543	8%	
40324 -	$45,263	6%	$19,418	3%	$65,405	9%	$16,633	2%	$33,614	5%	$110,704	15%	$53,548	7%	$149,908	20%	$96,472	13%	$20,694	3%	$35,500	5%	
40325 -	$56,256	8%	$52,295	7%	$85,258	12%	$46,955	6%	$110,857	15%	$10,204	1%	$42,248	6%	$98,795	13%	$24,160	3%	$50,797	7%	$141,095	19%	
40326 -	$56,121	8%	$22,063	3%	$84,431	12%	$27,541	4%	$37,957	5%	$137,271	19%	$77,347	11%	$78,354	11%	$32,397	5%	$31,982	5%	$123,273	17%	
40327 -	$52,560	9%	$42,925	8%	$95,605	17%	$16,655	3%	$49,203	9%	$109,021	19%	$37,377	7%	$128,484	23%	$35,369	6%					
40328 -	$23,467	21%	$77,057	68%	$13,193	12%																	
40329 -	$12,041	20%	$361	1%	$47,844	79%																	
40330 -	$6,324	33%	$13,030	67%																			
40331 -	$3,300	100%																					
Total	$708,580	8%	$520,845	6%	$709,674	8%	$447,923	5%	$618,652	7%	$786,940	9%	$605,030	7%	$748,634	9%	$507,188	6%	$489,679	6%	$734,138	9%	$

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Audience participation question

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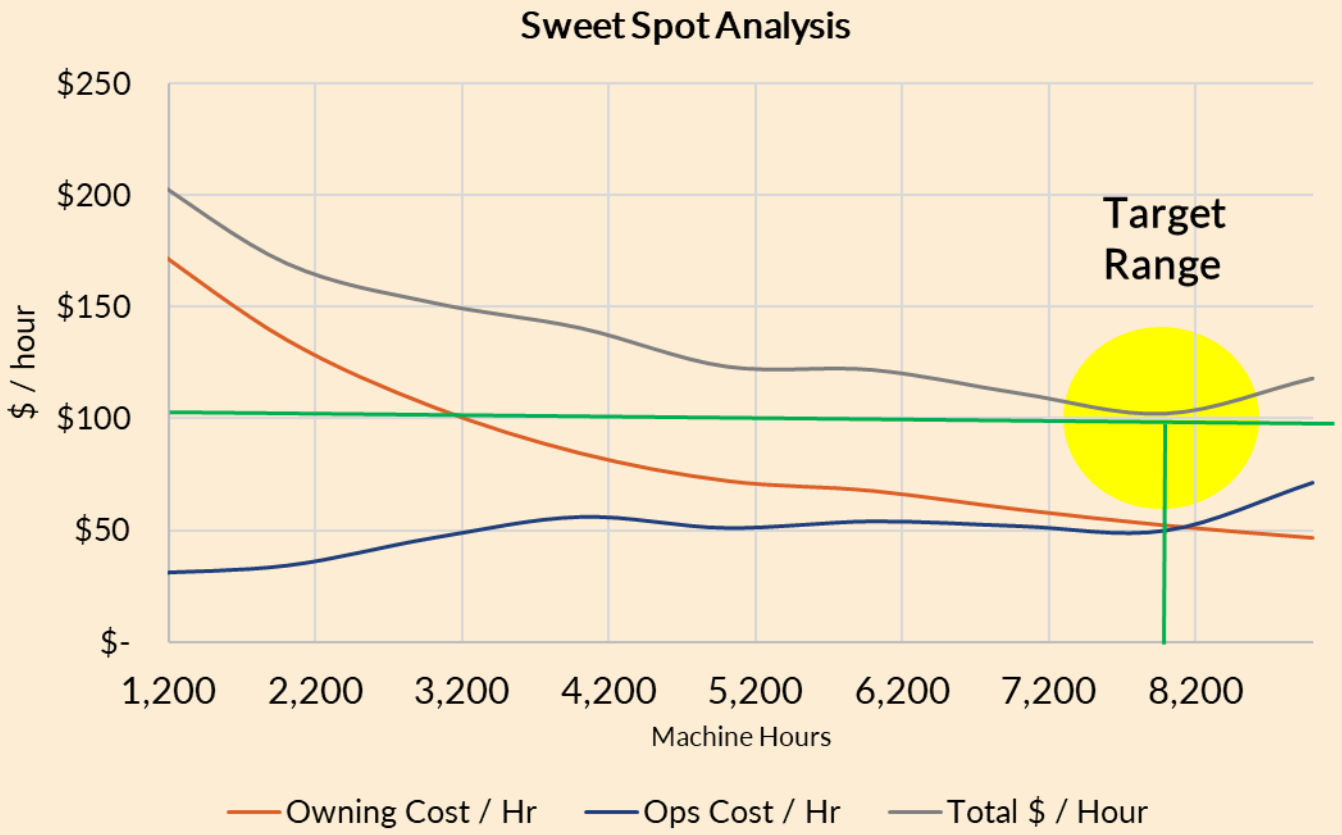
Next steps

Rate setting/Managing the age of your fleet

Operating cost curve…



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Rate setting/Managing the age of your fleet

Implementing the concept to help drive decisions & analyses

	A	B	C	D	E	F	G	H	I	J	K
1	Optimum life-cycle period.										
2		90%		↓		110%		120%		130%	
3											
4											
5				Optimum ownership period	Annual usage	Hours now	Expected future age in the given number of years ahead				
6							1	2	3	4	5
7	Unit #	Make	Model	Hrs	Hrs/yr	Data					
8	LRT 12-1	Wests	2	9,000	1,200	12,750	13,950	15,150	16,350	17,550	18,750
9	LRT 12-2	Wests	2	9,000	1,200	11,290	12,490	13,690	14,890	16,090	17,290
10	LRT 12-3	Wests	2	9,000	1,200	11,100	12,300	13,500	14,700	15,900	17,100
11	LRT 15-1	North	C3	14,000	1,500	15,879	17,379	18,879	20,379	21,879	23,379
12	LRT 14-4	North	C3	10,000	1,500	10,090	11,590	13,090	14,590	16,090	17,590
13	LRT 14-5	North	C3	10,000	1,500	9,800	11,300	12,800	14,300	15,800	17,300
14	LRT 15-2	Wests	2A	9,000	1,200	8,400	9,600	10,800	12,000	13,200	14,400
15	LRT 17-2	Wests	2A	9,000	1,200	8,220	9,420	10,620	11,820	13,020	14,220
16	LRT 14-1	Wests	2A	12,000	1,200	11,100	12,300	13,500	14,700	15,900	17,100
17	LRT 17-3	Wests	2A	12,000	1,200	10,900	12,100	13,300	14,500	15,700	16,900
18	LRT 14-3	Wests	2A	12,000	1,200	10,600	11,800	13,000	14,200	15,400	16,600
19	LRT 18-1	North	C3	10,000	1,500	6,689	8,189	9,689	11,189	12,689	14,189
20	LRT 18-2	North	C3	10,000	1,500	5,432	6,932	8,432	9,932	11,432	12,932
21	LRT 18-3	North	C3	10,000	1,500	5,400	6,900	8,400	9,900	11,400	12,900
22	LRT 19-1	North	C3	10,000	1,500	3,678	5,178	6,678	8,178	9,678	11,178
23	LRT 19-2	North	C3	10,000	1,500	2,100	3,600	5,100	6,600	8,100	9,600
24	LRT 20-1	Wests	2C	9,000	1,200	1,111	2,311	3,511	4,711	5,911	7,111
25	LRT 20-2	Wests	2C	9,000	1,200	989	2,189	3,389	4,589	5,789	6,989

The Churn Chart.

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Source: https://www.constructionequipment.com/

Audience participation question

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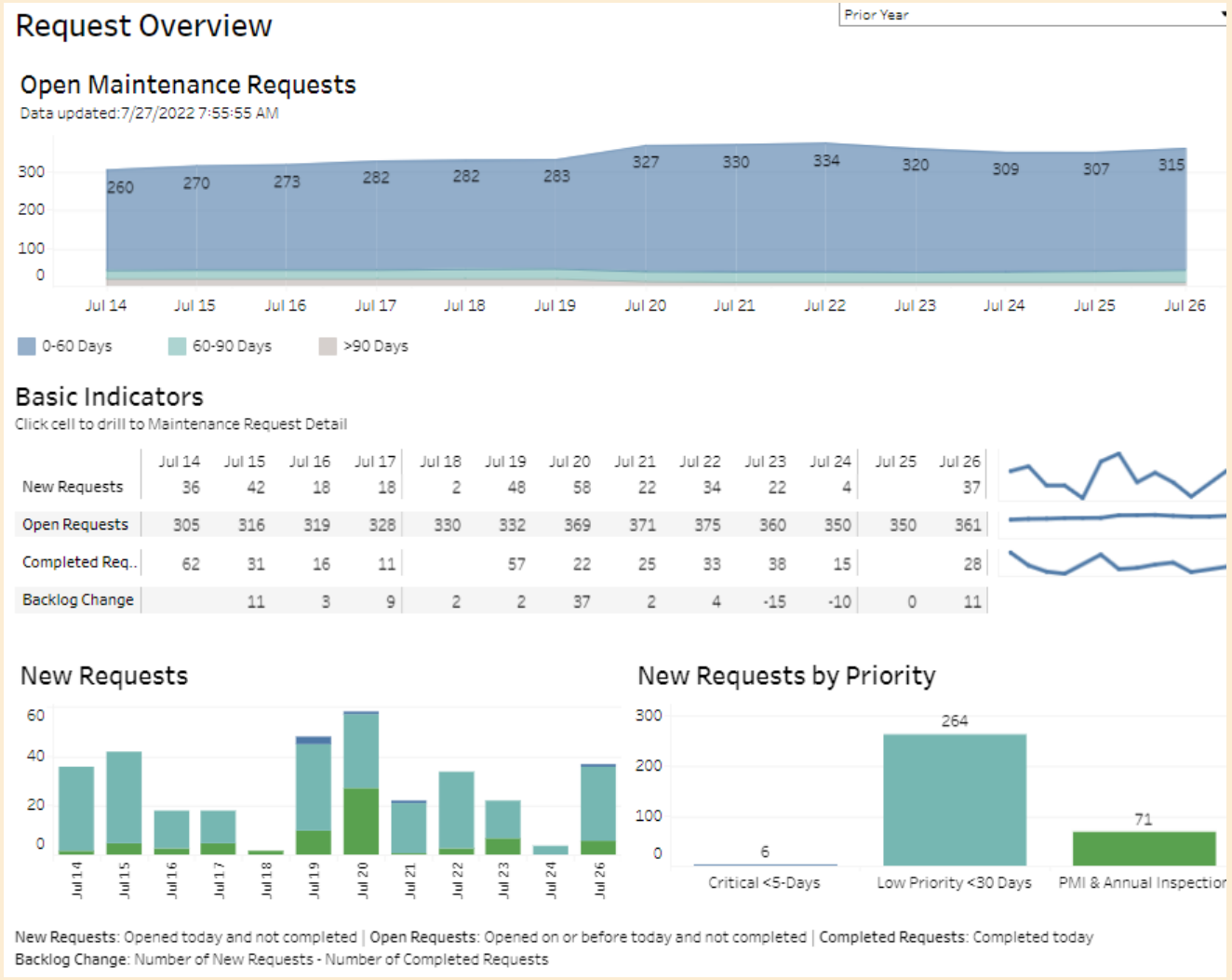
Equipment maintenance analytics

CONSTRUCTION FINANCIAL MANAGEMENT ASSOCIATION

Equipment maintenance requests



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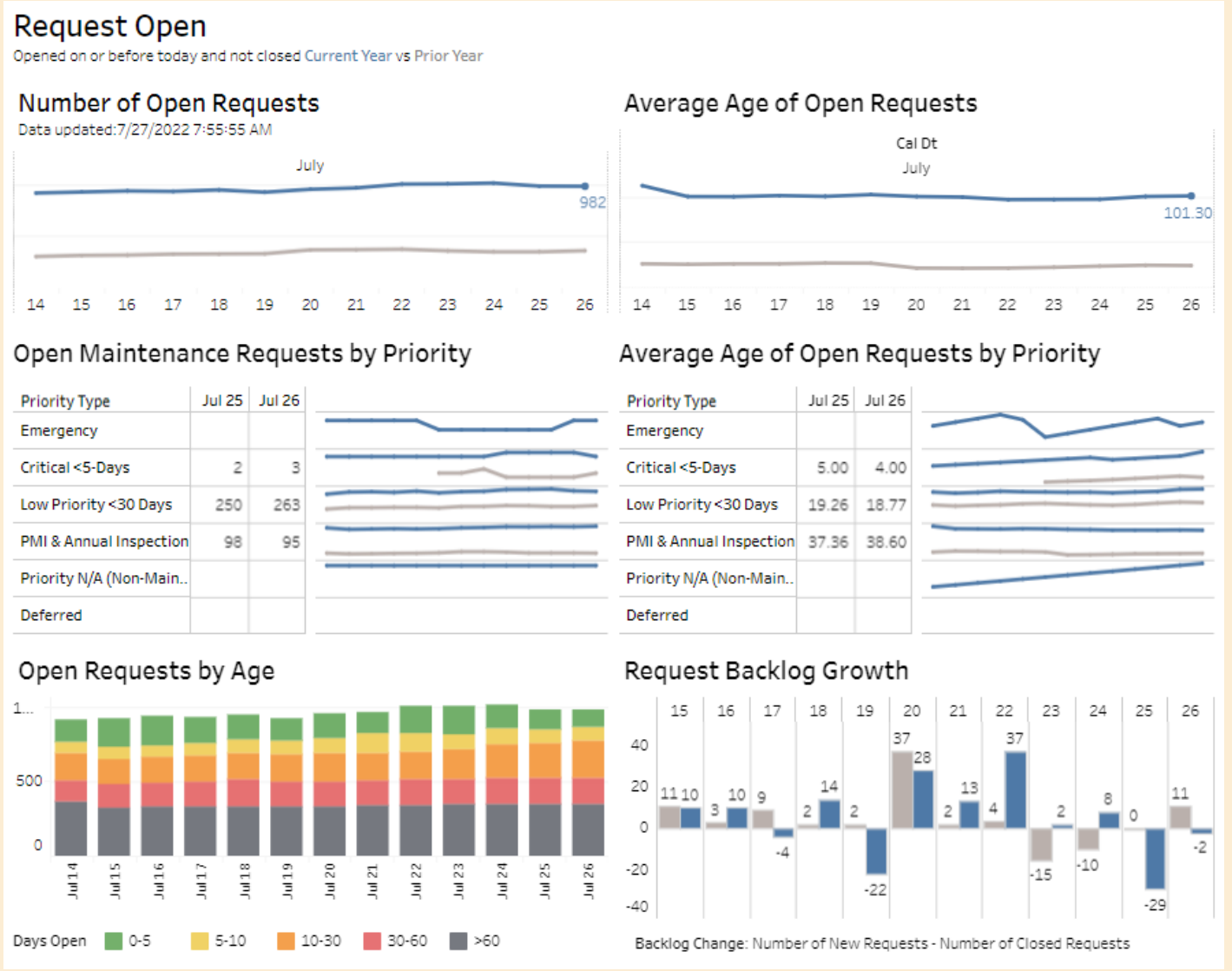
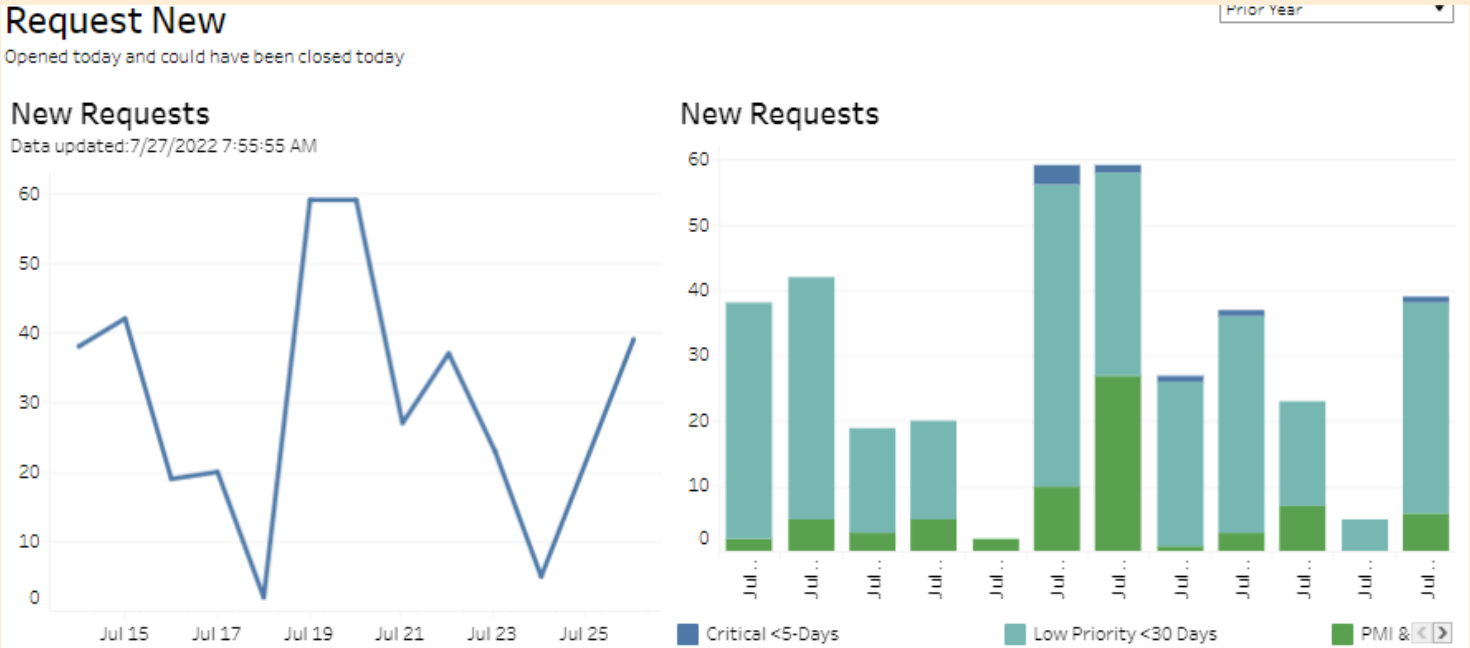
Equipment maintenance requests



CONSTRUCTION FINANCIAL MANAGEMENT ASSOCIATION

Equipment maintenance requests



	Jul 14	Jul 15	Jul 16	Jul 17	Jul 18	Jul 19	Jul 20	Jul 21	Jul 22	Jul 23	Jul 24	Jul 26
Emergency												
Critical <5-Days						3	1	1	1			1
Low Priority <30 Days	36	37	16	15		46	31	25	33	16	5	32
PMI & Annual Inspection	2	5	3	5	2	10	27	1	3	7		6
Priority N/A (Non-Maintena..												
Deferred												

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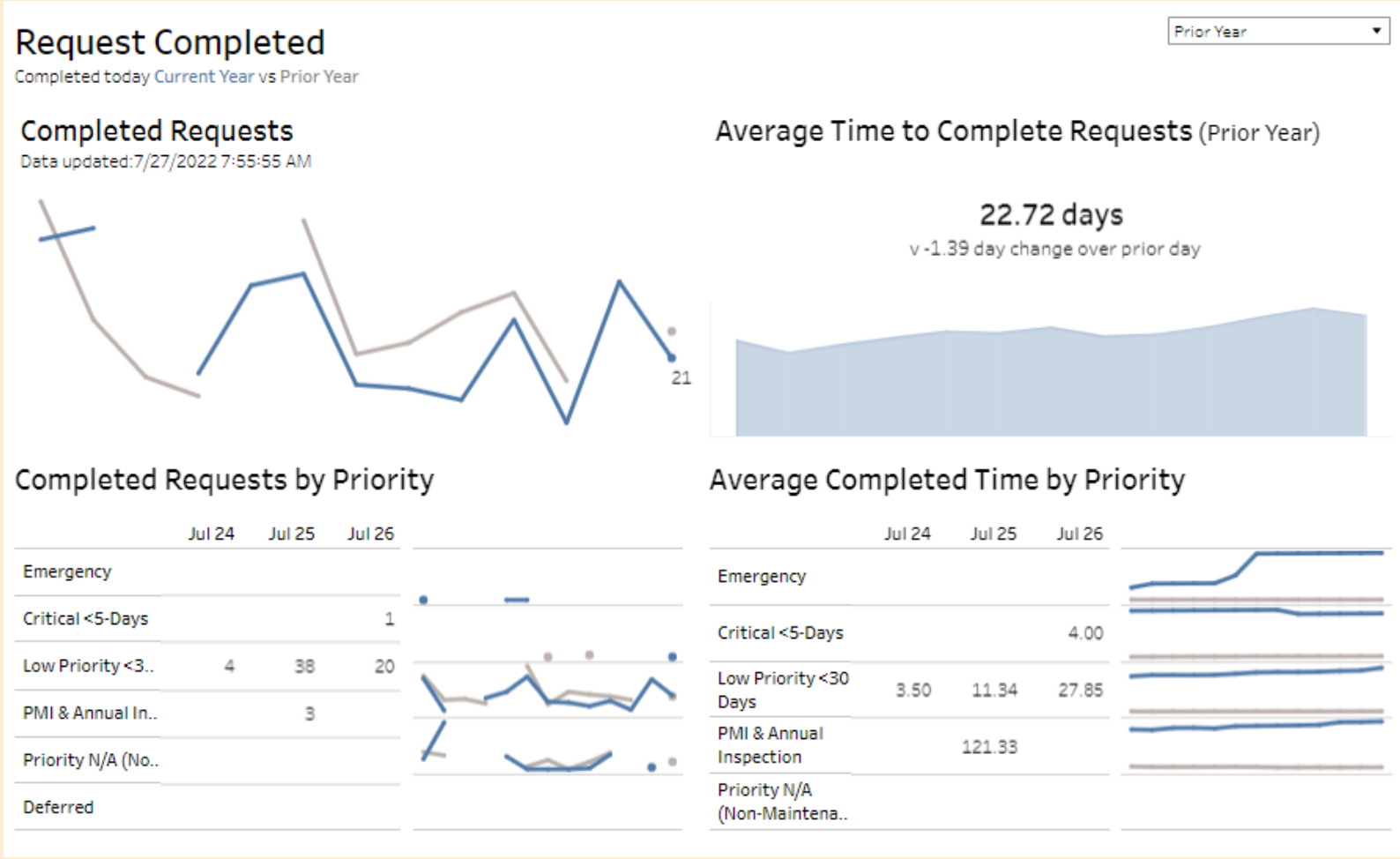
Equipment maintenance requests



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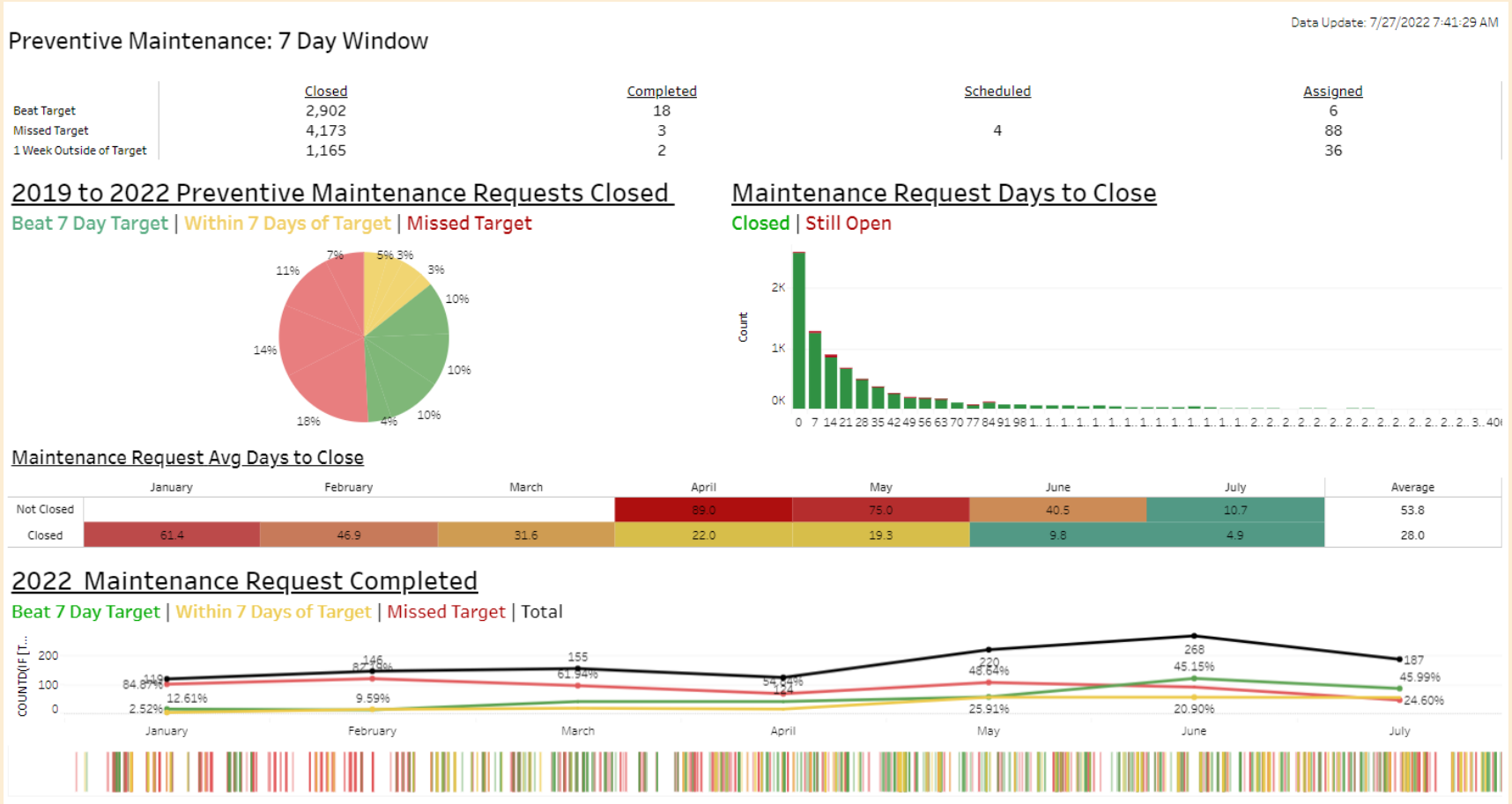
Equipment maintenance requests

CONSTRUCTION FINANCIAL MANAGEMENT ASSOCIATION

Equipment maintenance requests



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Lessons learned

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Many systems/data sources

- ERP
- EMMS
- Equipment Dispatch
- Project Mgmt (for field logs of equipment utilization)
- Estimating
- Telematics
- Fuel

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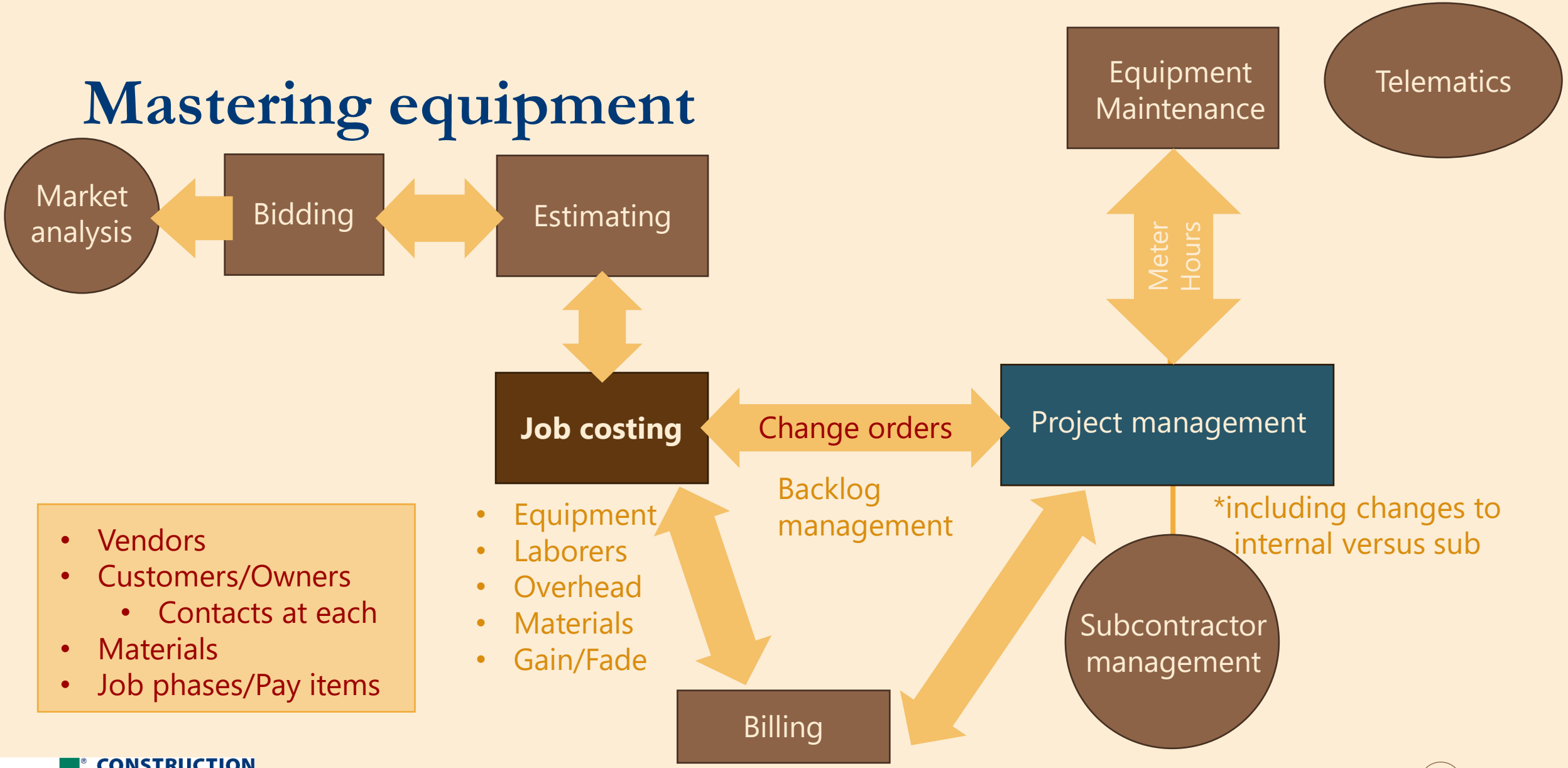
Mastering equipment



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The real-world problem of data issues

Customer name	Number of orders	Total paid
Chris Froome	11	11,000
Mark Cavendish	7	7,000
Bradley M Wiggins	6	6,000
M.S. Cavendish	6	6,000
Bradley Marc Wiggins	5	5,000
BM Wiggins	4	4,000
Taylor Hamilton	3	3,000
Tyler Hamilton	2	2,000
Brad Wiggins	2	2,000
Bradley Wiggins	2	2,000
Tylor Hamilton	1	1,000
B.M. Wiggins	1	1,000

Customer name	Number of orders	Total paid
Bradley Wiggins	20	20,000
Mark Cavendish	13	13,000
Chris Froome	11	11,000
Tyler Hamilton	6	6,000

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The real-world problem of data issues
Proven practice – exception reports

plante moran

Utilization Hours vs. Meter Hours

By Category & Equipment. Report Drills to the equipment and year selected.

**Right click on a row to drill-through to details*

Category: All

Active Status: All

Road Type: All

Equipment Name: All

Actual Year: Multiple selections

Green: 85-95% Working
Red: < 85% Working
Yellow: > 95% Working

Year	2019			2020			2021		
Category	Meter Hours	Utilization Hours	% Working	Meter Hours	Utilization Hours	% Working	Meter Hours	Utilization Hours	% Working
Backhoe	**56,478**	**39,939**	**71%**	**58,087**	**44,776**	**77%**	**65,235**	**45,842**	**70%**
Loader	**36,266**	**26,970**	**74%**	**64,572**	**49,242**	**76%**	**61,115**	**52,548**	**86%**
1- 2016 Komatsu WA480	2,782	2,590	93%	2,063	2,022	98%	2,753	1,459	53%
21- 2008 John Deere 644K	2,286	2,689	118%	8,943	7,237	81%	3,200	2,757	86%
33- 2019 John Deere 644K				2,726	2,341	86%	2,268	1,903	84%
40- 2019 John Deere 644K				2,289	1,970	86%	1,796	1,453	81%

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End user adoption

- Solve a business need
- Understandability
- Performance
- Accuracy
- Executive sponsorship

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AEMP/CFMA Benchmarking PSA

AEMP/CFMA benchmarking goals

- Develop maintenance and reliability metrics using common terminology for the construction industry's heavy equipment fleet maintenance process
- Standardize terms and definitions
- Establish standard calculation and formulation methods for metrics
- Provide a common platform to benchmark performance between peers
- Establish Industry Averages and Best in Class KPIs for comparison

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AEMP/CFMA metric categories

- Financial
- Cost
- Utilization
- Safety
- Preventative Maintenance
- Planning & Scheduling
- Labor Efficiency

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Thank you!

AEMP/CFMA KPI Benchmarking Committee

- Rich King, CPA, CCIFP (Co-Chair)
- Preston Ingalls (Co-Chair)
- Tim Giggee, CEM
- Randy Boseman, CEM
- Mike Vorster
- Ben Tucker, CEM
- Brian Cooney
- Caryl Coronis, CPA, CCIFP
- Herb Brownett, CCIFP (also AEMP)

Proofreaders

- Garrett Schemmel
- Chris Christiansen
- William Kohler

AEMP & CFMA Peer Reviewers

- Ernie Stephens, CEM
- Adam Ralph, CEM
- Matthew Case, CEM
- Yvette Aubin, CPA, CCIFP
- Jyll Waters, CPA, CCIFP
- Bob Tinglestad

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- Rachel Conner (AEMP Staff Support)
- Monica Di Lorenzo (CFMA Sponsorship)
- Mike Elek (CFMA Staff Support

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Q&A

Articles

- Growing into business analytics
- Business Analytics for Data Driven Decisions (CFMA)
- Improve Fleet Management with the right KPIs
- How construction companies can use business analytics to boost margins
- Case study: Large construction company upgrades critical ERP software
- Supercharge your industry peer group to drive innovation

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Session Password

(Must record password for CPE credit)