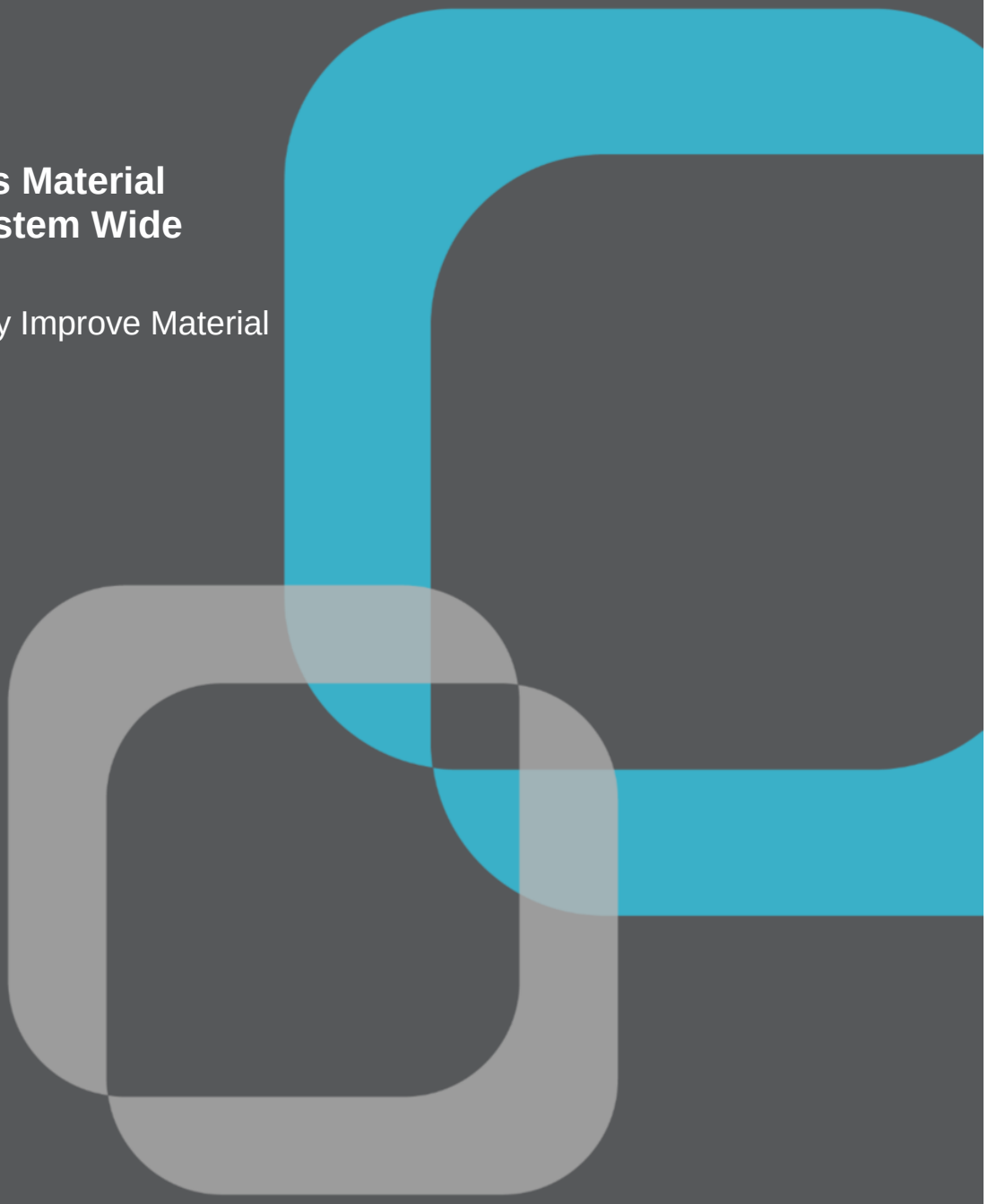
Inventory Versus Material Availability – System Wide

Does More Inventory Improve Material Availability?

June 2016



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Anyone dealing with system maintenance has experienced a moment when a repair or replacement part was not on hand when needed. This can result in everything from a minor inconvenience to a costly outage extension. Given this experience, there is a tendency to think, "If we only had more material in our warehouse, we wouldn't have these shortages." Many plant managers would prefer a "spare plant" in his or her warehouse, just in case. On the other side, supply chain professionals argue for lower inventory levels to reduce financial holding costs. In this article, we examine whether more on-site material actually improves material availability. And, if it does, by how much?

This is one of several questions examined by ScottMadden using data compiled by the Utility Material Management Benchmarking Consortium (UMMBC)[1] in their 2015 warehouse survey. This survey collected detailed data from 286 warehouses operated by 15 leading utilities. The breakdown of warehouses by business unit is shown in Figure 1.

Figure 1: Warehouse Participants by Business Unit

Utility Business Unit	Number of Warehouses
Fossil Generation – Coal	63
Fossil Generation – Gas	41
Fossil Generation – CT	26
Nuclear Generation*	31
Hydro Generation*	48
Distribution Only (Electric & Gas)	34
Transmission and Distribution Combined (Electric & Gas)	43
Total	**286**

*not included in this analysis

STOCKOUT RATES

In the 2015 survey, participants were requested to provide average Stockout Rates for the prior year as a measure of material availability. The Stockout Rate was defined as the percentage of items not available upon the requested need date. As shown in Figure 2, the resulting data indicated that median Stockout Rates were relatively low across all business units ranging from a low of 0.1% in combined transmission and distribution (T&D) warehouses to a high of 5.0% in distribution-only warehouses.

[1] The UMMBC was established in 2007 and currently consists of 56 leading utilities that periodically collaborate to develop information needed to critically examine and improve ongoing warehouse and inventory management operations in the electric & gas utility industry. Members participate in individual surveys on a voluntary basis. Comprehensive warehouse surveys were conducted in 2008, 2011, and 2015.

Figure 2: Average Stockout Rates by Business Unit[2]

Business Unit	Minimum	Median	Maximum	N
Fossil Generation – Coal	0.1%	2.4%	16.0%	29
Fossil Generation – Gas	1.1%	4.0%	22.0%	18
Fossil Generation – CT	1.5%	1.5%	37.1%	14
Distribution	0.0%	5.0%	27.4%	29
Transmission and Distribution Combined	0.0%	0.1%	17.1%	37

ON-SITE MATERIAL

The UMMBC survey also collected the dollar value of Total On-Site Material divided into three categories as shown in Figure 3.

Figure 3: Median On-Site Material by Category and Business Unit ($000 US)

Business Unit	FERC 154	Consigned	Capitalized	Total On-Site Material
Fossil Generation – Coal	$12,079	$8	$3,369	$13,144
Fossil Generation – Gas	$3,848	$0	$2,025	$4,947
Fossil Generation – CT	$1,103	$0	$0	$1,103
Distribution	$787	$0	$208	$1,140
Transmission and Distribution Combined	$2,878	$70	$294	$4,641

Most of the On-Site Material was FERC 154 inventory. The next material category was Consigned Material, which was owned by third parties but held at the utility's warehouse. Few warehouses in the database held Consigned Material. The third material category was Capitalized Material, material on-hand that has no dollar value in inventory insofar as it was expensed to projects upon acquisition. Neither Consigned Material nor Capitalized Material showed as "inventory" on the utility's books, but they were stored in the warehouse and issued as needed. As such, they impacted the utility's overall Stockout Rate. For this reason, they were included in our analysis.

ON-SITE MATERIAL VERSUS THE STOCKOUT RATE

Armed with this data, ScottMadden developed a series of correlations and regression equations using the Stockout Rate as the dependent variable and On-Site Material as the independent variable. The results are shown in Figure 4 below.

[2] Not all warehouses measured or were able to report average Stockout Rates. Nuclear and Hydro warehouses are excluded. "N" refers to the number of warehouse for which this data was submitted.

Figure 4: Correlation and Regression Test Results for Stockout Rate versus On-Site Material

Measure	Coal	Gas	CT	Total GEN	Dist	T&D	Total WIRE	TOTAL
Number of Cases	29	18	7	51	28	18	46	97
Correlation	-0.447	-0.385	-0.588	-0.426	-0.15	0.052	-0.144	-0.24
R Square	0.199	0.149	0.346	0.181	0.023	0.003	0.021	0.058
Y-Axis Intercept	0.07	0.084	0.223	0.089	0.084	0.041	0.069	0.073
Reg. Coeff. *10,000,000	-0.014	-0.039	-0.379	-0.022	-0.01	0.001	-0.004	-0.008

As the previously mentioned plant manager suspected, warehouses with more On-Site Material actually do have *lower* Stockout Rates. This relationship holds true for all types of generation warehouses and for distribution warehouses as well. However, the opposite occurs in T&D warehouses where more inventory is associated with *higher* Stockout Rates.

Before starting to increase On-Site Material to improve material availability, a bit of caution is in order. The regression analysis showed that the strength of the above relationships was very weak. Material levels "explained" from 0.3% (T&D warehouses) to 34.6% (gas generation warehouses) of warehouse Stockout Rates. Keeping in mind that warehouse Stockout Rates were very low to begin with, it took a great deal of additional material to significantly lower the Stockout Rate. In coal generation warehouses, for example, doubling the volume of On-Site Material would lower the Stockout Rate by less than one-hundredth of a percent. Not an encouraging trade-off.

So, while every company has a war story about the time when a $150 part caused a delay or problem costing thousands (or millions) of dollars, the data simply does not support increasing On-Site Material to improve material availability. Yes, the relationship we anticipated proved out, but it is far too weak to support growing inventory as a strategy for improving parts availability. Additionally, the analysis only scratches the surface on whether or not a particular utility's inventory is the right inventory. Thus, materials managers will need to look to other solutions to lower Stockout Rates and improve overall inventory health such as better demand planning, more sophisticated item forecasting capabilities in the absence of better demand planning, and enhanced investment recovery mechanisms for the inventory that is "stranded" and no longer providing value.

SCOTTMADDEN SUPPLY CHAIN SUPPORT

ScottMadden's long history of working with electric utilities and other asset-intensive companies and deep understanding of the key performance levers in supply chain gives us a clear lens through which to view efficiency and effectiveness. Additionally, ScottMadden's proven methodology to uncover the true drivers of inventory levels and develop realistic improvement plans is the most comprehensive approach in the industry. We encourage you to learn more about our capabilities and opportunities to optimize your inventory levels.

To learn more about ScottMadden's supply chain practice, please contact us.

ABOUT SCOTTMADDEN'S ENERGY PRACTICE

We know energy from the ground up. Since 1983, we have been energy consultants. We have served more than 300 clients, including 20 of the top 20 energy utilities. We have performed more than 2,400 projects across every energy utility business unit and every function. We have helped our clients develop strategies, improve operations, reorganize companies, and implement initiatives. Our broad and deep energy utility expertise is not theoretical—it is experience based.

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