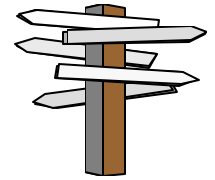


# THE MINNESOTA LOGGER



Minneapolis/St. Paul Chapter 6 District 6 of the  
International Society of Logistics (SOLE)

Minneapolis/St. Paul

No. 262

May 2004

## Chairman's Corner

### Meeting Notice - May Meeting

Thursday, May 20, 2004 beginning at 5:30 pm.

Meeting Topic: *Railroad Logistics*

We will meet at Jack Povlock's, Bloomington.

Please RSVP as indicated on the Notice below.

Guests are welcome and encouraged.

***We Hope to See You There!!***

We have added several unaffiliated SOLE members from neighboring states to our newsletter distribution this month. Several geographic areas and states do not have an operating SOLE chapter. We welcome our new readers!!

We again gave our presentation on logistics to the St. Thomas adult education class (see below).

A delayed note of congratulations goes out to Ken Dacas. Details are elsewhere in this issue. Good luck in your retirement, Ken!!

We are showing the info on the annual 2004 SOLE Conference & Exhibition to be held in Norfolk this summer. Plan now to attend this worthwhile event in late August (details below).

This past month we submitted the entry package for our newsletter to the 2004 SOLE Newsletter Awards competition (details below).

We are continuing our review of the GAO report GAO-03-887, DEFENSE INVENTORY Opportunities Exist to Improve Spare Parts Support Aboard Deployed Navy Ships (August 2003), describing the Navy's spare parts challenges. We are focusing on this report in this column (see the October, November, January, February, March and April issues of this newsletter). All are downloadable from our SOLE web page.

As we continue the analysis we are referring to the metric, "Supply Support Metric for Maintenance Tasks Completed," which is fashioned after the concept of the "perfectly executed work order" model (see diagram shown elsewhere in this newsletter).

We ended last month's discussion with analysis of the nine factors in "the last 500 feet of the supply chain".

This month we will summarize the factors described over the past several months, describe the range of values reported by the GAO study and show the means, standard deviations and range used for each factor in the model.

We know that we used *point estimates* in all prior data review. We also know from elementary statistics that for each point estimate there is an expected variation about the reported point estimate mean value of approximately  $\pm 3$  standard deviations (for normal distributions). Each factor has its own standard deviation in this case based upon sample results. Some standard deviations (s) were shown last month. We have added an s-value for the factors using data from the commercial studies this month.

By running a *simulation* of our model we hope to confirm that the outcomes experienced by the Navy in Supply Rate are indicative of the inputs of the nine factors in our model. >>>

### Advanced Notice - June Tour Meeting

The June meeting will be held on June 17 with a tour of the Mill City Museum in Minneapolis.

See the web site [www.millcitymuseum.org](http://www.millcitymuseum.org)

Admission is \$8.00. The tour starts at 6:00 pm. Directions on the web site.

Location is 704 South Second Street, Mpls.

We know that the two principle factors determining Supply Rate: the ship's equipment configuration accuracy and the accuracy of the allowance parts lists for the ship's equipment. The mean expected values in those two factors do not explain fully the lower Supply Rate reported in the GAO Study.

<b>GAO Study on Navy Spares Shortages:</b>	
<b>Factor in the Model</b>	<b>Mean &amp; Range of Values</b>
R1	Mean = 77%, range of 74.85% to 79.18% (2 samples)
R2	Mean = 82.7% (1 mean for 6 BGs)

There must effects of other factors at work for the six ships of the Lincoln Battle Group to have ship Supply Rate of the following values: 53.0, 37.2, 59.0, 78.7, 56.6, 60.1 and a mean value of **58.3**. If our model is good we should be able to approximate the mean and range of values shown here (range 37.2 – 78.7) with the results of the simulation.

“Simulation is a technique that measures and describes various characteristics of the bottom line performance measure of a model when one or more values for the independent values are uncertain. If any independent variables in a model are random variables, the dependent variable (Y) also represents a random variable. The objective of simulation is to describe the distribution and characteristics of the possible values of the bottom-line performance measure Y, given the possible values and behavior of the independent variables  $X_1, X_2, \dots, X_k$ ”. – Cliff T. Ragsdale, *Spreadsheet Modeling and Decision Analysis*, 2<sup>nd</sup> Ed. 1998, p. 487-488.

In our model the dependent variable Y is the Supply Rate and the independent variables,  $X_1$ , etc. are represented by the factors R1, R2, ... R9. See table in *Navy Spares Challenges* below.

Before we run the simulation we would like to know if there is any correlation between the independent variables of range and depth of parts stock vs. the dependent variable Supply Rate. See Table 1. It appears so. The USS *Paul Hamilton* had stocked the highest range (99.1%) and the highest depth of spares on board (98.8%) and also had the highest ship Supply Rate (78.7%). This was the only ship noted in the study that bested the Fleet goal of 65%. This observation called for performing a statistical test for correlation.

<b>Lincoln battle group ships</b>	<b>Percent of types allowed (range)</b>	<b>Percent of quantities allowed (depth)</b>	<b>Supply Rate</b>
Camden	97.9	96.4	53.0
Fletcher	97.5	83.4	37.2
Mobile Bay	97.0	96.5	59.0
<b>Paul Hamilton</b>	<b>99.1</b>	<b>98.8</b>	<b>78.7</b>
Reuben James	98.9	87.8	56.6
Shiloh	98.6	95.2	60.1
<b>Average</b>	<b>98.1</b>	<b>93.1</b>	<b>58.3</b>

I tested for correlation using a standard statistical technique. The Pearson coefficient of correlation (see Table 2) for *range* is + 0.597 with Supply Rate and *depth* is + 0.791 with Supply Rate (perfect correlation = +1.0). We conclude this with an approximate 80% level of confidence. The correlation is highest with depth of Spares. The value of +0.75 is generally described as *strong positive correlation*. We note that we have limited data here to draw this conclusion (6 samples) but will do so in the interest of the analysis. Our preliminary

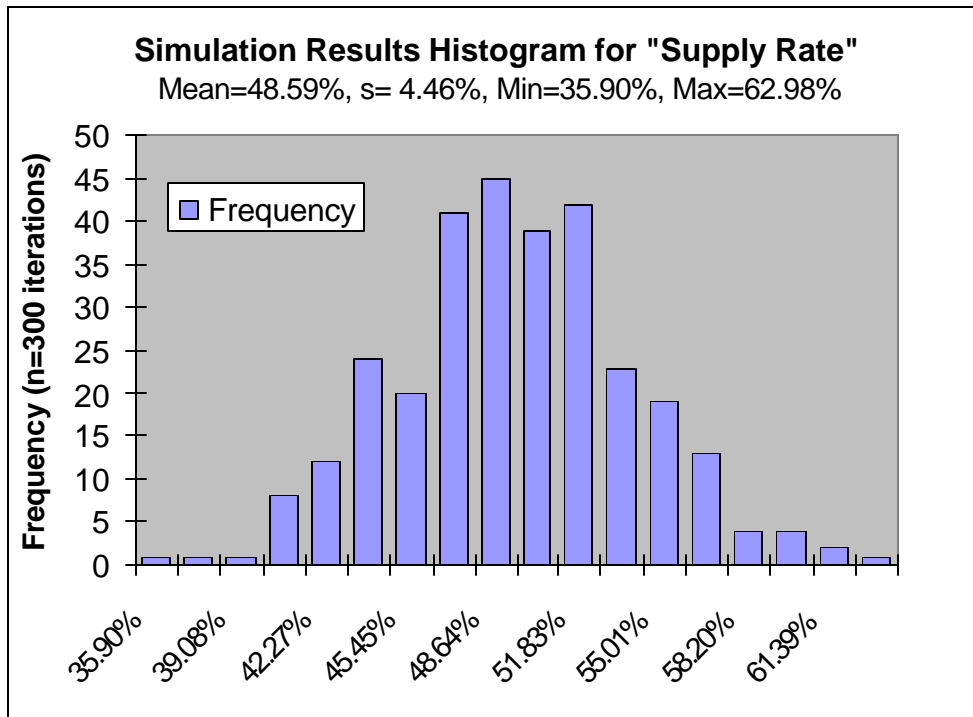
conclusion is that an increase in quantity (depth) of parts stocked has the greatest positive impact of the two on Supply Rate. The conclusion of the GAO study was there were two primary factors that contribute to the problem: the configuration accuracy and the accuracy of the allowance parts lists. This correlation analysis would suggest that increasing the depth of spares stocked (the quantity recommended by the Navy's sparing model output) is at least worth exploring as part of the eventual solution.

	6 sample size		
	<i>Depth</i>	<i>Range</i>	<i>Supply Rate</i>
<i>Depth</i>	1.000		
<i>Range</i>	.158	1.000	
<i>Supply Rate</i>	.791	.597	1.000
	± .811	critical value .05 (two-tail)	
	± .917	critical value .01 (two-tail)	

Our analysis using simulation is the next step. For the simulation we used a plug in for Excel. A product with more features called “@Risk” – a popular spreadsheet plug-in for Excel (Palisade Corporation, [www.palisade.com](http://www.palisade.com)) – could be used for more in-depth analysis. We loaded the data, selected the normal distribution for the 9 factors and selected the mean and standard deviation for each. The setup of the Excel workbook is show in Table 3.

<b>Factor in Model</b>	<b>Simulation Values (Mean, Standard Deviation)</b>	<b>Simulation Formula</b>
R1	Mean = 77%, s = 0.0306	=RNGNormal(0.7702,0.0306)
R2	Mean = 82.7%, s = 0.0306	=RNGNormal(0.827,0.0306)
R3	Mean = 95%, s = 0.0167	=RNGNormal(0.95,0.0167)
R4	Mean = 95%, s = 0.0163	=RNGNormal(0.95,0.0163)
R5	Mean = 98%, s = 0.0083	=RNGNormal(0.981,0.0083)
R6	Mean = 93%, s = 0.0602	=RNGNormal(0.93,0.0602)
R7	Mean = 99%, s = 0.0033	=RNGNormal(0.99,0.0033)
R8	Mean = 94%, s = 0.02	=RNGNormal(0.94,0.02)
R9	Mean = 99%, s = 0.0033	=RNGNormal(0.99,0.0033)
<b>Supply Support Metric for "Supply Rate"</b>	Mean, Distribution and Range Produced by Model - determined by the simulation.	= PRODUCT(R1..R9)

We ran the simulation for 300 iterations and produced the following output graph.



In the GAO study there were two primary factors that were suggested as major contributors to the problem: the configuration accuracy and the accuracy of the allowance parts lists. The product of those two means (above) would be  $0.77 \times 0.827 = 0.6368$  or 63.7% a value higher than the reported Fleet average of 54% and higher than the reported Lincoln Battle Group average of 58.3%. We note that the two primary factor values are based on two averages for configuration accuracy and one overall fleet value for accuracy of the allowance parts lists. For these two factors the small number of samples and fleet averages vs. ship averages affect the computed values and mean, minimum, maximum of the simulation for "Supply Rate" in this analysis. The desired detail for these two factors, other than the data in the report itself, is not available from GAO.

The simulation results would seem to confirm that additional factors with the approximate values shown are contributing to the end result value of "Supply Rate". We note the simulation produced descriptive statistics with a mean of 0.4859, a standard deviation of 0.0446, the minimum value of 0.3590, and the maximum value of 0.6298.

Next month we will review the simulation results, draw conclusions and conclude our examination of the Navy's spares problems aboard ship as documented in the GAO Study (August 2003). That column will provide the final analysis that will lead to better understand the Navy's spare parts availability problems.

Larry DeVries, CPL  
Chapter Chairman

## 2004 SOLE International Conference & Exhibition

**The focus of all SOLE members this summer should be on attending ...**

The 39th Annual  
International Conference  
and Exhibition

**"Future Logistics:  
the Integrated  
Enterprise"**

Norfolk, Virginia  
31 Aug - 2 Sep 2004

Check the web site at  
<http://www.sole.org> for details.

indeterminate measurements of factors and interactions between factors statistically through observance of forced changes made methodically as directed by mathematically systematic tables.

Shari described the selection of the correct number of experiment runs to gain the desired power of the experiment. Disaster #1 to avoid is not finding any effects. Disaster #2 is finding the wrong effect. The correct procedures will, first, choose the correct power of the experiment dominated by selecting the desired number of runs and, second, make use of fractional factorials to avoid aliasing mistakes.

Between the first speaker, the dinner meal, and the second speaker a number of officers of the ASQ chapter gave short briefs on (1) the upcoming local seminar events, and (2) the upcoming changes in membership structure within ASQ.

The post-dinner speaker began after the meal about 8:00 pm. That topic was "ISO/TS 16949 (Auto Industry Proposed Standard) Implementation at Donaldson, Inc." This was presented by Chuck Weygand, Quality Systems Manager. Donaldson is a Bloomington located firm specializing in filtration products of all types with a big market in the automotive and off-the-road equipment industry. They produce filters for the M1-A1Abrams Tank and the Bradley Fighting Vehicle.

This particular proposed standard is coming out of the automotive and transportation vehicle industry. It is not yet a standard but a decision on that will be made by 2005 by the governing body. It is multi-national in that a number of European countries are involved in the specification. Its contents are "two-thirds ISO9000:2000 with several other specifications to make up the whole". A key part of being compliant with the specification is that the firm's suppliers must be ISO9000 certified. A good number of supplier firms are not now certified and any firm choosing to be certified to ISO/TS 16949 will need to have a fully certified supplier base (there is a phase-in period allowed). In addition to some of the terms that are already part of the Baldrige and ISO9000 quality models there are new terms in ISO/TS 16949 such as "turtle diagrams" – consisting of input, output, methods, material,

## April 2004 Chapter Meeting Recap

**Tuesday, April 13<sup>th</sup>**. The evening dinner meeting was with the local American Society for Quality (ASQ) section ([www.mnasq.org](http://www.mnasq.org)).

The meeting was held at the Holiday Inn, North St. Paul. The pre-dinner presentation started at 6:00 p.m. The topic was "How to Avoid Design of Experiment (DOE) Disasters" presented by Shari Kraber, PE, CQE, from StatEase, a local software and consulting firm ([www.statease.com](http://www.statease.com)). She covered the basics of DOE with an emphasis on selecting the correct Power of the design.

A Design of Experiment (DOE) is a structured, organized method for determining the relationship between factors (Xs) affecting a process and the output of that process (Y).

Other Definitions:

1 - Conducting and analyzing controlled tests to evaluate the factors that control the value of a parameter or group of parameters.

2- "Design of Experiments" (DoE) refers to experimental methods used to quantify

people & measures of effectiveness. In addition, new terms are COPs, SOPs, MOPs and MOEs: customer-oriented processes, support-oriented processes, management-oriented processes and measures-of effectiveness. It is an external auditor enforced specification.

The meeting was well attended and the topics were very interesting and well presented.

### Unaffiliated SOLE Member Outreach

After contacting SOLE headquarters we understood there were a number of SOLE members in states and geographic areas that were not assigned to an existing SOLE Chapter.

Two Minnesota members not assigned to C6D6 were added to the distribution list in April.

Current unaffiliated SOLE members that live in Wisconsin were also discovered after discussions with Sarah James, Executive Director of SOLE.

We have added those e-mail addresses of SOLE members in WI, SD, IA, and NE to our newsletter distribution this month.

If you are receiving this newsletter for the first time we hope the distribution reaches members that would otherwise not receive communication from a SOLE Chapter.

Welcome!!

## Chapter Web Page

News of our Chapter is on our SOLE web page <http://www.sole.org> then Member Services > SOLE Web Sites > Dist 6 Cha 6 Minneapolis – St. Paul (Twin Cities)

### Minnesota Logger entered in 2004 SOLE Newsletter Competition

The entry package for the *Minnesota Logger* into SOLE's annual newsletter awards competition was forwarded to the VP of Administration on April 13, 2004. The package consisted of a cover letter, copies of each of the 10 newsletters produced during the period, and a self-scored Scoring Sheet using the template provided by SOLE HQ for this purpose. This entry represents an attempt to recognize our newsletter at the national level. The announcement of winning entries will be made at the 2004 SOLE Conference & Exhibition in Norfolk (details elsewhere).

The *Minnesota Logger* won the 2003 SOLE Small Chapter Silver Newsletter Award last year.

### To members of the Chapter – Larry Cork, Vice Chairman Technical:

I took the job in California. I drove to Palmdale last week, and start at Lockheed-Martin this coming Monday (4-12-04). I will not be available for any position in the Minneapolis-St. Paul chapter in the coming year.

Best of luck to all of you!

Larry Cork [larry\_cork@msn.com]

## Ken Dacas Retires

Ken retired February 1, 2004, from his position as a Manager, New Product Development, Industrial Filtration Group, for Donaldson, Inc., of Bloomington, MN, where he worked for almost 22 years. After a short time off he chose to go back to Donaldson for a project as a consultant and worked there for the month of March. Ken was a former Chapter Chairman for two terms in 1989-1991 and again for two terms in 2000-2002 (see Chapter History on the web page). He continued to volunteer to support the Chapter in many ways when he was not Chairman. Ken and his wife will continue to reside in Minnesota. Good luck, Ken. Contact Ken at [kdacas@aol.com]

## FUTURE CHAPTER MEETINGS

### 2003-2004 CHAPTER SCHEDULE & TOPICS

Date	Event	Remarks
Thursday May 20, 2004	“Railroad Logistics”	Meet at Jack Povlock’s
Thursday, June 17. 2004	Tour / Mill City Museum, Minneapolis.	Final meeting for year.
The chapter takes a meeting and newsletter hiatus during the months of July and August each year.		

## Navy Spares Challenges

In our analysis of the Navy supply challenges the “last 500 feet in the supply chain” appears to be summarized by following:

R1	Obtain Accurate System Configurations for Individual Systems and Sum to the Ship’s Total Configuration
	*
R2	Obtain Accurate Allowance Parts Lists (APLs) to match the Ship’s Total Systems Configuration) (Range of Items)
	*
R3	Forecast Anticipated Maintenance Events & Item Demand for Period of Deployment (Depth of Items)
	*
R4	Obtain & Maintain Quality Items (Parts)
	*
R5	Stock Range of APL Items on board Ship
	*
R6	Stock Depth of APL Items on board Ship
	*
R7	Stock & Maintain Accurate Inventory Levels on board Ship
	*
R8	Pull the Anticipated Item(s) from Shipboard Stock for the Maintenance Task As it Occurs during Deployment
	*
R9	Complete Maintenance Task Using Items as Necessary. Return Unused items to Stock. Forward Repairable items to Repair Cycle. Complete Work Order with Accurate Data.
	=
	Supply Support Metric for Maintenance Tasks Completed

The serial events above must be completed with the required high percentage for the numerical product of all tasks to be a sufficiently high percentage. The concept of describing the execution of “the perfect work order” applies here.

## St. Thomas Guest Lecturer Presentation

One of the objectives of SOLE is outreach in the industrial and educational communities.

Tom Becker, Instructor for MMSE 609, Purchasing, Logistics, and Distribution, at the University of St. Thomas, St. Paul, invited the chapter to provide a guest lecturer on April 28, 2004, for a repeat performance of last year's presentation on "Logistics Engineering & Integrated Logistics Support" (see the May 2003 Minnesota Logger).

The Chapter again focused our briefing on a presentation to the students in this master's degree program evening class for adult education students in Engineering and Technology Management. The St. Thomas program details are on the program's web site at <http://www.stthomas.edu/engineering>

Larry DeVries, CPL, gave the presentation to about 22 students. The one-hour slide briefing covered an introduction to logistics including the distinction between commercial consumables and more complex products & systems; the topic of affordability affected by cost, schedule, and performance and the concept of Life Cycle Costs; and the definitions of Reliability, Availability and Maintainability with some examples on consumer maintenance. As an example of a maintenance concept of a "large system" he used the Light Rail Transit system currently being constructed in Minneapolis. The presentation lasted about one-hour.

The set of slides for last year's briefing are available on the Chapter's web site for download. The slides for this year are available upon request.

## 2003 SOLE Conference Proceedings Available

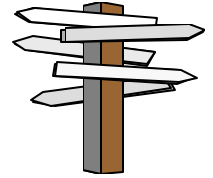
The CD-ROM of the 2003 SOLE Conference is now available. The conference theme was, "Melding Defense & Commercial Logistics". On the CD are copies of those presentations and papers from the conference. There were a number of presentations on Performance Based Logistics.

Also included with the CD is another CD containing the keynote address by Dr. Werner Von Braun, Director of what eventually became NASA, during the 1<sup>st</sup> Annual SOLE Symposium, 13 September 1966, in Huntsville, Alabama.

Any chapter member who desires a copy of the proceedings should contact SOLE headquarters directly or contact any chapter officer listed elsewhere in this newsletter.

# THE MINNESOTA LOGGER

Minneapolis/St. Paul Chapter 6 District 6 of the  
International Society of Logistics (SOLE)



## MINNEAPOLIS/St. PAUL CHAPTER MEETING

MEETING DATE: **Thursday, May 20, 2004**

LOCATION: Jack Povlock's Place

TIME: 5:30 pm

COST: No Cost

MEAL: Hot hors d'oeuvres

MEETING TOPIC: "Railroad Logistics"

- **Directions to the meeting: Take US 169 south past I-494. Exit on the last exit in Bloomington, Old Shakopee Road and Riverview Road. Turn left (east) onto Old Shakopee Road. At the first traffic light, turn left (north) onto Bloomington Ferry Road. Turn right at the first driveway, which is Landau Drive. Make the first left turn (past one building only on your left) into a cul-de-sac. Jack lives in the end building, northwest corner. Please park in overflow parking places. The address is: 7624 Landau Drive, Bloomington. Jack's home phone number is: 952-944-7142. If you need help, please call.**
- **We hope to see you there!!**

**RSVP: Call if you wish to attend not later than May 19, 2004 to (763) 954-6263.**

Honeywell

Jack Povlock, CPL  
(763) 954-6263

Lockheed Martin

Michael Erickson  
(651) 456-4265

United Defense

Open

Other

Larry DeVries, CPL  
(612) 743-3509

PLEASE POST

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