New Zealand Presentation

Slide #1

1. What is the Technology and Maintenance Council and what does it do?

For the benefit of those of you who are unfamiliar with the Technology & Maintenance Council I'd like to start off by giving you a brief description of the council, its organizational set up, what it tries to accomplish as a group, and who are it's members.

The Technology & Maintenance Council is basically a collection of fleets and suppliers who work collectively to improve equipment, and to provide one unified voice on equipment and technology issues, and to communicate those interests to the relevant governmental bodies and to the manufacturing community. We do this by writing recommended practices that fleets and manufacturers can follow.

It all started some 46 years ago when a handful of maintenance directors sat down with representatives from the truck manufacturing community to discuss reoccurring equipment maintenance problems. The meeting was historic in that it marked the first time that truck users decided to collectively address manufacturers about equipment-related problems. Prior to that historic meeting, cooperation from truck builders was virtually non-existent. Soon after that meeting, the beginnings of the maintenance council took shape. Since then, TMC has grown to an organization of close to 4,000 members split evenly between truck users and suppliers. Our members include virtually every type of manufacturer and every type of carrier, including less than truckload, truckload, private carriers, leasing fleets, and municipalities.

Slide #2: TMC Organizational Chart
Categorically, TMC is currently broken down into 14 operating study groups with each study group dedicated to a separate segment of the truck or to a separate segment of the industry.
The study groups are:
*Electrical and Instruments
*Tires & Wheel
*Engines

*Cabs and Controls
*Fleet Maintenance Management
*Chassis
*Trailers and Bodies
*On-board Vehicle Electronics
*Light and Medium Duty Trucks
*Data Interchange
*Automated Data Entry
*Technology & Logistics Management
*Off-board Data Communications

*And a special study group dedicated to "Future Truck" technologies which takes a "systems engineering" approach to the development of future trucks.

Operating within each study group there are task forces which can be chaired by either fleet members or suppliers and this is normally where the nuts and bolts work is done.
Let me say that where the study groups are permanent in nature, the task forces are temporary. Task forces typically have a two-year life in which an industry problem is recognized. When a task force is formed, in cooperation with suppliers, and in some instances the government, a recommended practice or standard is developed. Currently, we have about 70 task forces in existence who provide the technical resources to develop equipment standards. A frequently asked question is how do we communicate the different standards to the industry. We develop and publish for our members and any interested party the following publications.

1. Recommend Maintenance Practices Manual: which is distributed to all full members. This is a manual which includes over 1,000 pages of recommended practices that fleets can use in maintaining or spec'ing equipment.
2. Recommended Engineering Practices Manual
3. Technology and Maintenance newsletter which is a monthly publication that includes equipment tips, and news on government rulemakings.
4. The Trailblazer - an 80-page report on each of our three national meetings.
5. Maintenance Manager Magazine - a magazine that is distributed quarterly. As well as providing feature articles on equipment, the magazine also keeps fleets informed of council developments and news.

6. Specific manuals that are developed by our study groups such as technical guidance on vehicle alignment practices; a manual on Radial Tire Wear Conditions and Causes, and the Users' Guide to Wheels and Rims.
7. Occasionally we write technical position papers that are presented at the Society of Automotive Engineers truck and bus meeting held every fall. In the past, we have written technical position papers which basically outlined fleet users' requests for improved equipment. In these papers, we present to the manufacturers some specific equipment improvements we would like to see 5-8 years from now.

Technical Activity of Council includes working with manufacturers and government agencies to tests new technologies and regulations to ensure that new products and practices provide a better environment for the trucking industry to survive in.

That is a brief description of the Council and as you can see we cover a whole range of technical and operating issues, but I would like to share with you a few comments about the whole issue of standardization in the transport industry, as well as how and why the equipment and maintenance community needs to be involved regardless of whether these standards emanate from either the government or the manufacturing community.

I think it is fair to say that in the United States we have seen an explosion of federal standards that have impacted the industry, and much of the talk you hear about standards revolves around the conflict between industry and government-issued standards. But it is important to remember that standards have taken on additional, less negative dimensions over the years.

Slide #3: 3 Categories of Standards
Primarily, standards fall into 3 categories:

*1.) mandated or strictly regulatory standards
*2.) cooperative standards between government and industry
*3.) purely industry-driven standards

While each of these standards have appropriate uses, they traditionally are met with resistance in conservative industries such as ours. Some of the prejudices surrounding many of these standards include:

Slide #4: Prejudices and Myths of Standards
*standards stifle innovation
*standards turn a product into a commodity
*standards put the consumer at the mercy of the manufacturer
*standards merely establish the lowest common denominator

Slide #5: Positive Elements of Standards
On the other hand, the positive elements of standardization include:

*standards provide economies of scale and lower the cost of production
*standards facilitate buyer-seller transactions involving complex goods
*most importantly, from our standpoint, standardization can provide an alternative to legislation

This last point is very important because whenever the industry takes " pro-active" steps in developing its own standards, the friction and animosity between the public and private sectors begins to disappear.

Consequently, the equipment and maintenance community is seeking to adopt a more pro-active approach when working with the governmental bodies regulating our industry.

Slide #6 Cooperative Effort Between Government and Industry
A second type of standard we are beginning to see is that which is developed out of a model of cooperation between government and industry . . . And the results of this process are beneficial for everyone.

The chief benefit is seen because of having industry experts that can give real life information to our government officials so that regulations can be written to offer benefits to the general public while still having workable solutions for our industry. Keep in mind that all regulations are not bad and if it has a public benefit we are obligated to meet it in good faith.

Slide #7 Industry Driven Standards
A final type of standard that we are seeing is that which is purely industry-driven. Perhaps the best example of successful implementation of these types of standards falls in the area of electronics.

Where fleets generally see the absence of government standards as beneficial, the absolute reverse is true regarding industry electronic standards. Electronics and diagnostics have to be standardized, and TMC and SAE are constantly refining and updating the major electronic standards in the industry . . . Namely TMC/SAE J1708, J1587and J1939.

Slide #8 1939 Slide
And if you want to take a peek preview of the future electronic standard for trucks, here is a diagram of J1939 which will be the multiplexed standard that will carry us well into the 21st century.
We don't have time to go into what all this means . . . But it works similar to the internet network that can be used to connect different computers in an office environment, this new standard will allow a number of different electronic control modules on a truck to share data and communicate with each other.

Slide #9: Summary . . . 3 Types of Standards
I'd like to recall the 3 patterns of standards we face as an industry today:
*strictly regulatory
*cooperative standards between government and industry
*industry-driven standards

It seems that these days the motoring public and legislators are involved in our industry as are design engineers. Whether we in the industry can live with such an arrangement is irrelevant at this point. We must learn to accept and live by it. This can only be done by the development of standards that we can all understand and design or work towards, with the frame of mind that coincides with the following philosophy.

Slide #10: TMC/ATA Philosophy
As an industry we must recognize that if a proposed rule or regulation is good . . .

That is, if the public benefit exceeds the cost . . . We are bound by good faith to attempt to meet it. Anything less only hurts our credibility.

Slide #11: One of the most widely accepted standards that has ever been developed within TMC is the Vehicle Maintenance Recording Standards Coding Convention, commonly called by it's acronym VMRS. I would like to give you a brief overview of this very important worldwide standard.

Slide #12: VMRS establishes a universal reporting language that has the capability of crossing all borders whether they be between countries, industries, companies, or departments. It is the common shorthand for equipment maintenance reporting. While it was developed for the trucking industry it's design and capability allow it to cross over into in industry which uses any form of equipment to complete its task.

Slide #13: VMRS is made up of 56 code keys and 14 instructions sets providing standard language for identifying equipment specifications, labor functions, and parts condition. It is only limited by your imagination and computer skills when it comes to producing reports and valuable data for management decisions.

Slide #14: The standard consists of 5 systems for standard data codes. These are the Vehicle / Equipment Master Record Codes, Repair Order Codes, Maintenance Facility Information Codes, Manufacturer Codes, and Component Codes.

Due to time restraints I will only touch on a few of these which I feel will be of the most interest to you. If you would like to go deeper into these, we can discuss these in the panel session or after the meeting.

Slide #15: The Vehicle/Equipment Master Record Codes are used primarily to segregate your equipment by vocation and specifications within those vocations. These codes allow you to create a birth certificate for your equipment.

Slide #16: I will skip the master record codes and go straight to the repair order codes. As you can see from the slide these 5 codes allow you to determine why you are doing work, what work was done, how much priority was put on the work, where the work was done, and the condition of the parts that were replaced. All of this is very necessary if you are to understand the reasons and the make-ups of your repairs. We will later talk about predictive maintenance. Predictive maintenance is impossible without the repair order codes.

Slide #17: The manufacturing component codes are the most used and widely recognized codes within VMRS. Many people only know of these codes and feel that VMRS is a strange way of assigning part numbers. Code Key 33 does assign a standard code to like components. Code Key 34 assigns a manufacturers code to these components.

Slide #18: Parts Codes are broken up into 3 subsets, system codes 31, assembly codes 32, and component codes 33.

Slide #19: Let's take a look at how this works. First you have the system codes which are 3 digits. This has been updated from the previous 2 digit codes in order to allow for expansion of the codes to encompass all on and off highway equipment. You will notice that the power plant is 045.

Slide #20: Now within that system we have different assemblies. And each assembly has a 3-digit code. So in order to describe a system assembly you use 6 digits.

Slide #21: Within that system assembly you have component codes. Also made up of 3 digits. By adding these component codes you are able to pinpoint exactly what component you are replacing or working on. By tagging that number along with a manufacturer code, such as Cummins, you now know that you are working on a Cummins camshaft idling gear.

Slide #22: There are 15 major advantages to VMRS. VMRS is easy to use because it was designed for both shop and management level use and allows for effective communications between management and the shop floor.

Slide #23: VMRS is cost effective because the fleet does not have to create it's own coding convention.

Slide #24: It follows accepted accounting practices.

Slide #25: It enables the maintenance department to do sound budgeting, thereby controlling costs and labor expenses.

Slide #26: VMRS helps control costs by providing the ability to detail records and an analysis of parts and labor expenses. It also offers a basis for developing equipment life cycles.

Slide #27: VMRS can give you the ability to improve facility management, by allowing you to code complete labor and material distribution as well as assisting in purchasing decisions.

Slide #28: It allows you to break your labor down into direct and indirect labor. Direct being labor that is charged to a vehicle and indirect labor being labor that is charged to support the direct labor. An example of indirect labor would be clerical work or cleanup after a vehicle has been repaired.

Slide #29: VMRS can greatly improve your ability to control parts inventory and depending on your countries taxation policy. It can give you accurate documentation to supply to your regulatory agencies.

Slide #30: VMRS is recognized by most OEM manufacturers as an ideal coding standard for filing warranty claims and supporting those claims.

Slide #31: VMRS improves PM programs. Whether you perform preventive maintenance or predictive maintenance you will find that coding standards have the ability to greatly improve your ability to determine what intervals give you the best cost per mile for your maintenance dollar.

Slide #32: VMRS allows you to benchmark within your company or within your industry to determine the best parts, equipment, or operating processes for your individual fleet. The possibility of reducing your unit cost can be greatly reduced by using coding standards.

Slide #33: VMRS assists equipment replacement decisions
VMRS allows data gathering to support decisions concerning most cost effective vehicles and components for future specifications.
VMRS allows detail reporting of various equipment fleets to determine when vehicles should be replaced.

Slide #34: After working for over 20 years with the VMRS system and looking at many company design coding systems, I feel that a worldwide accepted coding system that allows you to communicate with your regulatory agencies, your manufacturers, your competitors, and company departments is the best way to improve your ability to reduce your costs and maintain a stable secure company.

Slide #35:

2. An Operators Perspective on Predictive Maintenance.

In Peter's invitation for me to come and speak to you, he requested that I cover the subject of a US fleet operators perspective on predictive maintenance. Many of us use the term preventative maintenance but this is not the proper term for what we are trying to accomplish. Let's give some definitions to the terms "Predictive Maintenance" and "Preventative Maintenance"

Slide #36: Preventative maintenance as described in the operator's manual and shop manuals from the manufacturers have a tendency to try to cover worse case scenarios. This can cause you to greatly overspend on maintenance while trying to prevent breakdowns. Predictive maintenance on the other hand looks at the operation and vocation of the individual piece of equipment and then formulates a schedule for when maintenance should be performed. This is done by looking at past history of various component part failures to determine when individual components should be serviced or replaced. At Southeastern Freight Lines it is our goal to get somewhere between 95% and 99.9% of the life of the individual component before it is repaired or replaced. You may say why don't you want a 100%. The answer is that when you get a 100% there is an extremely good chance that you are going to have an on the road breakdown which will drive the repair cost up greatly, increase the downtime, and create customer relations problems.

Slide #37: Several years ago we decided that it was time to implement a predictive maintenance process at Southeastern Freight Lines. At that time we had been using a very modified and limited version of VMRS as well as hand written work orders. In order to accomplish our new goals it was determined that we would have to incorporate the complete VMRS coding standards and a reporting program in order to insure that our predictive maintenance schedules could be produced and maintained for each individual piece of equipment that we were running.

Slide #38: Once these standards were incorporated we were able to start building history to show us the life of the individual component for each type of vehicle. It was necessary to educate the technicians on what we were trying to accomplish so that we could be assured that they were entering correct data relating to mileages and parts used.

Slide #39: Without the cooperation of the technicians the data would become useless for developing a predictive maintenance schedule. Not only do technicians have to record the data pertaining to mileage and parts used, they must also record why a part is being replaced. In VMRS this is called a failure code. In the system that we use we also flag parts when a technician goes to replace it so that we can recover all warranties for parts that are removed during their warranty period. Just as a note; this is done on three different levels, we flag parts based on the vehicles warranty, the individual assembly warranty, as well as the warranty of the component within the assembly.

Slide #40: Predictive Maintenance for Forklift timing Belts
Let's run through a quick scenario of one particular part. According to the Linde Baker shop manual we should replace the timing belt on their forklift Engine every 3,000 hours. Using the Predictive Maintenance process we set up a small test fleet and began replacing the belts at various hours of usage. Each time the belt was analyzed for evidence of failing for any reason. As these belts were examined it was determined

(Slide #41) that the suggested 3,000 hours change could be extended to a minimum of 6000 hours with no detriment to the engine.

Slide #42: The cost savings if we don't consider charging for down time of the forklift turned out to be over $38,000.00 over it's useful life of the 71 forklifts. Considering that this is only one component, this is a considerable savings and really cuts the cost and down time in half when considering the manufacturer suggested replacement times.

Slide #43: Is the Effort Worth it?

As you can probably tell this required a great deal of effort and time on our part, in order to be able to create these schedules for repair. Was it worth the effort? Well, I will let you be the judge. Prior to implementing these changes our cost per mile was running a yearly average of 23.02 cent for pure maintenance. After these changes were implemented this cost fell to 15.796 cent per mile. We ran 131,396,639 miles or 236,513,950 km during the year 2001. This savings that we attribute to our changes amount to $9,494,721.00 U.S. or $22,810,022.78 N.Z. We feel that it was well worth the effort to make these changes. For the year 2002 we are running 14.64 cent per mile year to date through April.