



# EMESRT

Earth Moving Equipment Safety Round Table

“Join us on the journey to improve design one step at a time”



## OUR STORY

Since early this century, mining companies have jointly discussed the contribution of earth moving equipment design to unwanted events such as incidents, damage and production delays. The catalyst behind the formation of the global initiative called the Earth Moving Equipment Safety Round Table (EMESRT) was a shared goal of filling the knowledge gap between equipment designers and customers by focusing on new designs where the opportunity for major change was not only possible but also made economic sense.

EMESRT works closely with mining industry Original Equipment Manufacturers (OEM) to continually improve the design of equipment at the source, to achieve designs beyond standards, making machines safer to operate and maintain.

Compliance with technical standards does not imply that risks are adequately controlled. EMESRT believes that hazard identification and task-based risk assessments must be a part of the design process. And so, the journey to improve design one step at a time began.

## OUR VISION

A mining industry free of fatalities, injuries and occupational illnesses associated with operating and maintaining exploration and mining equipment.

## OUR PURPOSE

Accelerate the development and adoption of leading practice designs to minimise the risk to Health and Safety through a process of OEM, contractor and end user engagement.

## OUR KEY MESSAGES

- Designing beyond standards
- Balancing engineering and behaviour
- Recognising the value of task based design review
- Appreciating that the OEM does its best with the end user involved
- Working together toward common goals (one industry voice!)

## Standards

On their own, published standards / guidelines do not assist in moving the improvement wheel up the hill.



They do provide a wedge that embeds the minimum requirement preventing the wheel from rolling back down the hill.

Moving the wheel up the hill is driven by initiatives like EMESRT. Success can only be achieved by working together to gain a common understanding of the problem 'one industry, one voice'.

Since its formation, EMESRT has influenced a number of strategic developments in equipment design.

This was achieved through the eight Design Philosophies (DP) which depicted the industry's views of the design problems we face.

## Design Philosophies

1. Access and working at heights
2. Tires and rims
3. Exposure to harmful energies
4. Fire
5. Machine operation and controls
6. Health impacting factors
7. Manual tasks
8. Confined spaces and restricted work areas

These design philosophies stimulate the designer to consider machine design from the point of view of the end user. They then proactively develop new solutions and innovative ways to reduce the risks of maintenance and operating equipment. These are the building blocks of the Operability and Maintainability Analysis Technique (OMAT) principals.



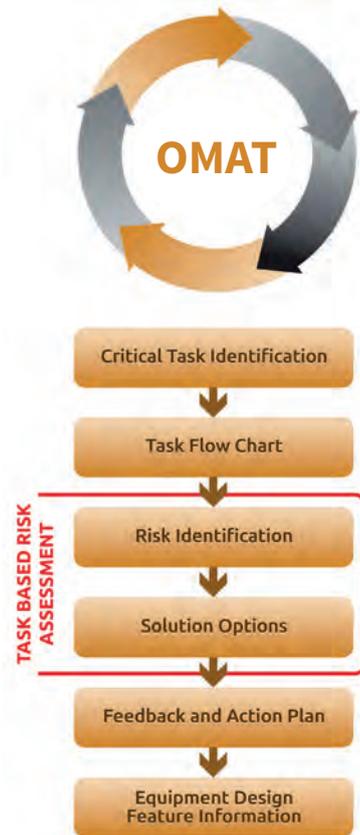
## Beyond Standards with OMAT

The Operability and Maintainability Analysis Technique (OMAT) is a 'beyond standards' method which focuses on operational and maintenance tasks for any piece of equipment.

OMAT is a task-oriented risk assessment developed to help designers identify and understand the human factor issues associated with operating and maintaining equipment.

Ideally, OMAT should be implemented at the concept stage of equipment design by original equipment manufacturers, though it can also be used on site to review newly purchased or pre-existing equipment.

It aims to ultimately eliminate design-related safety issues through strategic hazard identification, risk ranking and control selection. EMESRT member companies and OEMs are currently using OMAT to identify and eliminate manual handling and access and egress issues of surface mining haul trucks.



This training method can be used by designers within OEMs to become more aware of ergonomic and human factor risk management issues when designing heavy earth-moving equipment for mining companies. By becoming more aware of ergonomic and human factor perspectives, designers can be more proactive in incorporating these ideas into their designs.

The OMAT training manual can be downloaded from the EMESRT website ([emesrt.org](http://emesrt.org)).

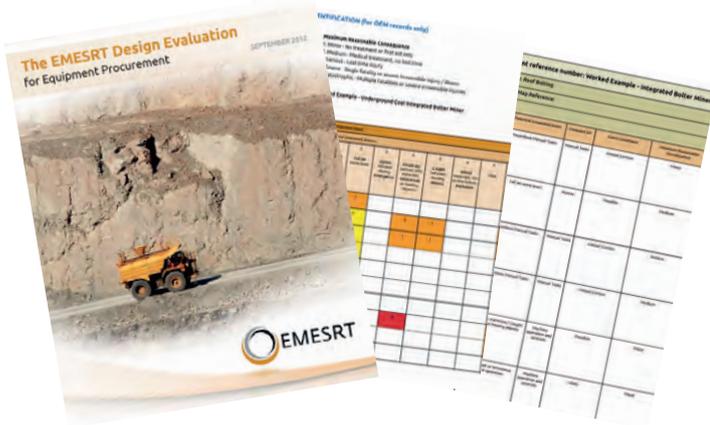
## The EDEEP Process

The EMESRT Design Evaluation for EME Procurement process is a suite of tools which includes the OMAT principals. It was developed to assist the OEMs to demonstrate how they have addressed the problems set out in the DP. It allows industry members to thoroughly evaluate OEM equipment at a residual risk within maintenance and operability tasks, through the use of design controls.

The EDEEP document is made up of key sections directing the user towards a final document to be supplied to the purchaser for evaluation.

1. Critical Task Identification (CTI) information
2. DP reference information
3. Task Based Risk Assessment (TBRA) document information
4. Design feature information from the TBRA

The EDEEP process documents can be downloaded from the EMESRT website ([emesrt.org](http://emesrt.org)).



## Introduction into Vehicle Interaction

The eight DPs provide the backbone for all EMESRT work. Late in 2013, when collision avoidance systems became a major focus of the industry, EMESRT took on the challenge to:

1. Clearly define the problem
2. Understand the scenarios
3. Build a set of performance requirements to enable evaluation of proximity detection systems on the market with vastly differing capabilities

This work proved to be far more complex than previous topics EMESRT had undertaken. DP 5, 'Machine Operation and Control' clearly encompasses the extent of the Vehicle Interaction (VI) problems.

However, it did not contain enough detail for designers to fully understand the issues.

When mining vehicles collide with other vehicles, people or infrastructure, the outcome can be a fatality or multiple fatalities. Often a less severe outcome occurs such as a lost time injury, or equipment damage.



EMESRT adopted a nine step hierarchical type model around design, operate and react. It focused the engagement with the OEMs, and for the first time allowed us to engage with the third party suppliers of VI systems to provide a 'one voice' of the industry approach.

The scenarios and speed ranges representing the most common interactions for mining equipment in both underground and surface operations were developed by EMESRT. It proved invaluable to clearly articulate to the suppliers the breadth of complexity in solving the problem.

This work has culminated in the development of the performance requirement document PR 5A to augment the existing DP 5. It allowed for clear communication of system capabilities, requirements and performance between the parties.

The last piece of the puzzle was 'how to make these systems communicate seamlessly', in other words 'plug and play' over the vast array of mining equipment and allow for these new systems to take control of operating equipment where necessary.

EMESRT initiated and facilitated a collaborative industry working group with both OEMs and Proximity Detection System (PDS) suppliers to develop a common electronic communication protocol that enables slowing down and stopping of mobile equipment. This J1939-based protocol forms one part of a new ISO standard for Collision Awareness and Avoidance.

This project brings together OEMs, PDS suppliers and end users with the 'one voice'.



## OUR MEMBERS

EMESRT member company representatives actively promote the EMESRT engagement process at industry forums to a wide audience around the globe and have introduced resource materials developed by EMESRT to help understand the risks faced by operators and maintainers of earth moving equipment. Our efforts have generated considerable interest from companies operating in areas other than surface and underground mining.



BARRICK

GLENCORE



RioTinto

## OUR WEBSITE

The EMESRT website is an informative resource and contains information on DPs, EDEEP, OMAT, case studies, recent published documents on VI, news and membership information. The site has a Reading Room where OEMs, suppliers, and the general community can have instant access to documents, presentations and other informative items. The items in the Reading Room are made available to EMESRT website visitors with the understanding that content will not be changed or amended in any manner if items are shared with others.

To find out more about EMESRT and what else is available on our website please visit [emesrt.org](http://emesrt.org).

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