EMESRT
Earth Moving Equipment Safety Round Table

Earth Moving Equipment Safety Round Table (EMESRT®)

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"Atlantic Alliance" Conference, 20/21 October 2010, Brussels, Belgium

xstrata
VALE
RioTinto
MISHC
AngloAmerican
BARRICK
bhpbilliton
Centennial Coal
COLLAHUASI
NEWCREST
NEWMONT

Presentation overview…

- What is EMESRT?
- History and previous activities
- 2010 and beyond
- OMAT and other EMESRT resources

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Earth Moving Equipment Safety Round Table Members

What is EMESRT?

EMESRT Vision

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

EMESRT Purpose

Accelerate development and adoption of leading practice designs to minimise the risk to Health and Safety through a process of Original Equipment Manufacturers (OEM), contractors and end user engagement

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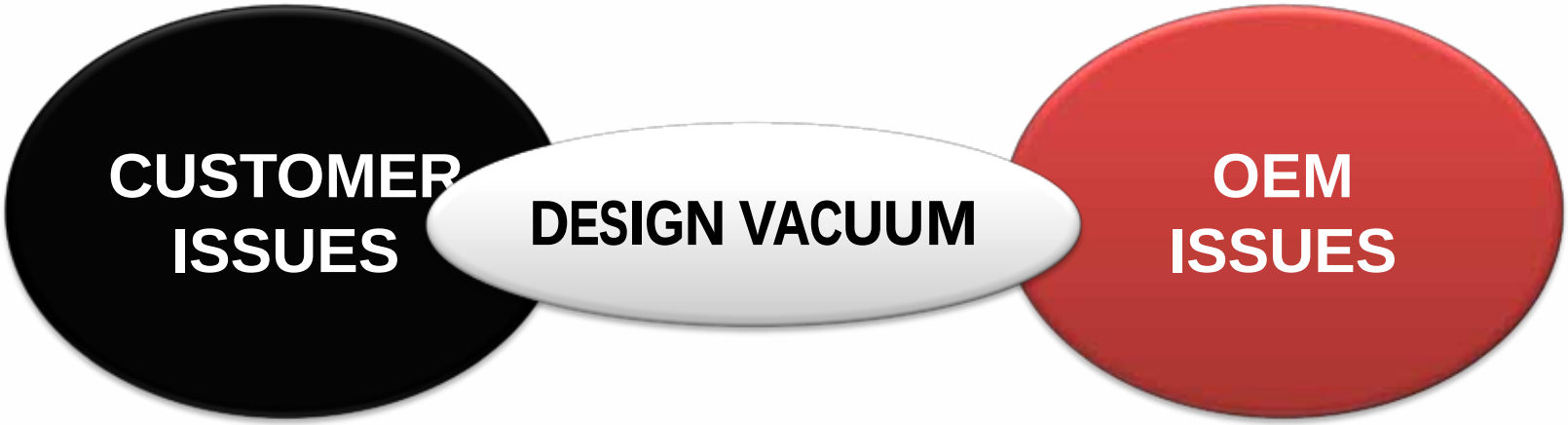
The need for EMESRT



- **Sites have committed resources to improving designs**
- **Sites have encouraged 3rd party designs**
- **But there is potential conflict with add on designs**
- **Residual risk is not always identified**

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How has EMESRT attempted to influence OEMs?

- Marketing people are very influential in product development
- Mining companies needed a critical mass to influence Marketing
- Define “Problems” not stipulate “control” solutions
- Leave the OEM designers to develop solutions
- Critique solution’s ability to address the “problem”

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Engagement tools: Surface Design Philosophies

EMESRT DPs

1. Equipment Access & Egress
2. Working at Heights
3. Noise
4. Whole-body Vibration
5. Fire
6. Dust, DPM & other airborne hazards
7. Isolation of energy, including parking
8. Visibility/collision detection & avoidance
9. Machine stability/slope indication
10. Guarding
11. Controls & Displays
12. Tires & Rims
13. Manual Handling
14. Operator Workstation
15. Confined spaces

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EMESRT Resource Materials

www.mirmgate.com/emesrt.asp

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Update since 2008

- EMESRT expansion beyond Surface to cover UG Hard Rock, UG Coal/Soft Rock & Exploration Drilling
- Continued & new engagement with OEMs
- Evidence that EMESRT is influencing OEM approach to design
- Recognition by regulators of EMESRT approach
- Growth through links with other industry groups

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Recognition by regulators

Queensland Mines Inspectorate (Department of Employment Economic Development and Innovation)

invitation to speak about EMESRT at seminars:

- Proximity Detection
- Roofing Bolting
- Quarrying seminar

NSW DII - references to EMESRT and EMESRT resources in their guidance materials

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Global links with other industry groups

- This EMESRT presentation at the 2010 Atlantic Alliance Conference in Brussels

Atlantic Alliance Conference presentations

Please click below to view PDF files of presentations shown at Atlantic Alliance conferences.

2010 Brussels

2008 Washington

2007 Munich

2006 Dundalk

2005 Orlando

2004 Cornwall

The **'Atlantic Alliance'** is an international body formed to share Health and Safety knowledge in the field of aggregates quarrying/mining. Founded by the UK, USA, Germany and Eire, the Alliance comprises representatives (from both sides of the Atlantic) of **Industry**, H&S **Regulators** and global/local **Manufacturers** of plant and equipment. Future meetings of the Alliance will occur every 2 years; the next scheduled event being 'Brussels 2010'.

www.safequarry.com

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Global links with other industry groups (cont)

SMART - *Surface Mining Association for Research & Technology*

- EMESRT invited to SMART meetings in Canada – oil sands mining operations
- SMART members interested in EMESRT approach
- SMART members include:

ArcelorMittal Mines Canada
Barrick Gold Corporation
BHP Billiton Diamonds Inc.
BHP BMA Coal Australia
Canadian Natural Resources Ltd.
Cliffs Natural Resources
De Beers Canada Inc.
Foundation Coal West Inc.
Freeport McMoRan Copper & Gold
Iron Ore Co. of Canada
Kinross Gold Corporation
KMC Mining Corporation
Ledcor CMI
Mitsubishi Development Pty Ltd
Newmont Mining
North American Construction
NovaGold Resources Inc.
Peabody Energy Corporation
Prairie Mines & Royalty Ltd.
Queens University
Shell Canada Ltd.
Suncor Energy
Syncrude Canada Ltd.
Teck Resources Limited
Thiess Pty Ltd
TransAlta Corporation
University of Alberta
University of Arizona
University of British Columbia
URS Corporation, Washington Div

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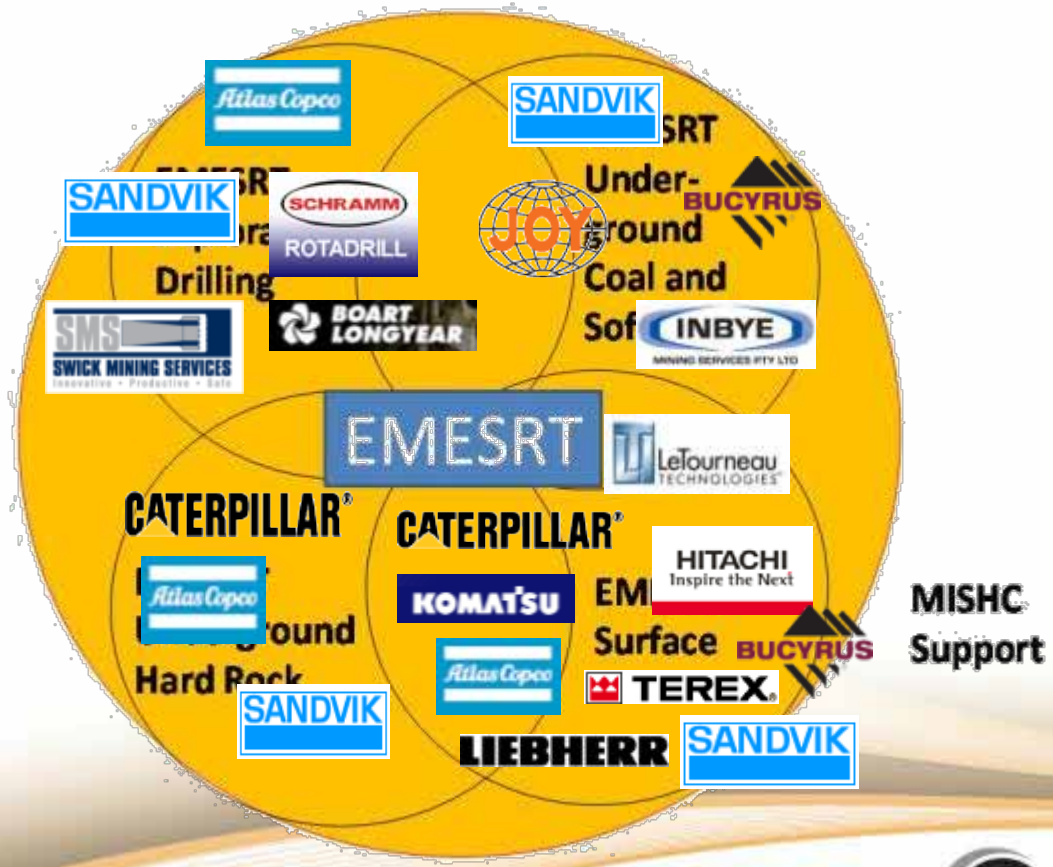
Engagement with OEMs

2009 & ***2010***

all Technical Groups engaging with OEMs



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EMESRT Surface Group engagement

Invited to participate in Cat HSEC Forum
EMESRT booth at MINExpo – informal engagement with OEMs at this event

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Example of OEM design response to DPs

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Risks to be mitigated

1. Equipment Access & Egress	
Objective	The objective is to minimise the risk of events related to approach, access & egress of equipment; as well as slip/trips, sprains/strains, falls from height and failure to egress in emergency events to ALARP, including consideration in design for foreseeable human error.
General outcome	The intended design outcome should include the following: Adequate/suitable stairways, walkways, access platforms, railings, steps/grab handle combinations and boarding facilities including an alternate path for disembarking in case of emergency. Specific to hauling trucks, a priority outcome would also be ground entry to access on driver's side, with the opportunity to locate isolation and other service points (hydraulic, air) near the driver's side operator access.
Risks to be mitigated	
Examples of industry attempts to mitigate risks	opportunity to locate isolation and other service points (hydraulic, air) near this operator access All equipment b. Sufficient independent egresses, one of which is the normal access stairway c. Emergency egress free and unencumbered with path-to-ground as rapid as possible d. Non-slip surfaces and edges suited to operating conditions (ice, mud, etc.) e. Adequate access lighting with two-way switching from cab and ground level, step tread highlighting f. Steps designed to minimise damage in operation, minimise impact on operator visibility and minimise accumulation of material g. Guardrails that protect for fall during access h. A stable, bottom step on the access that is not greater than 400mm (16 inches) from level ground i. Specialised powered access systems designed for primary access only that fail to a safe position and can only be able to lower when the machine has been parked with all implements lowered and the park brake applied. j. Kickboards that prevent objects from falling from platforms onto persons that may be below

Risk of sprains and strains due to ergonomically difficult body positions when accessing equipment

Retractable stairways that eliminate the first step

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Recent engagement with OEMs

Over two weeks in September 2010, 21 different miners from ten different companies travelled to the United States.

Nine OEMs in six locations:

- Dallas (Atlas Copco, LeTourneau),
- Gainesville (Sandvik),
- Newport News (Liebherr),
- Guelph – Ontario (Hitachi)
- Milwaukee (P&H Mining/Joy Global; Bucyrus)
- Peoria, Illinois (Komatsu, Caterpillar)

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Recent engagement with OEMs (cont)

BUCYRUS, Joseph Helfrich, the Vice President for Surface Mining:

"*This is a very important meeting for us. We have all of our product line heads here. Our goal is that you can go from machine to machine to machine and they will all have the same safety features.*"

Craig Ross, Barrick, was greatly encouraged after the meetings:

"All of these OEMs have advanced in their design philosophy approach since the last visit, and are now very ready to engage with the EMESRT group in building products for the future that have safety designs built in at the factory. There has been a real shift in the OEMs…. Now, the EMERST group is ready to send our operators and maintenance technicians into their design studios. It will be a win-win for everyone in the end."

One OEM achieved a 60% reduction in pre-delivery modifications with 40% reduction in delivery delays through being compliant with EMESRT DPs

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2010 & beyond

- Expect to see new designs that address risks highlighted in DPs
- Evaluation of equipment risks in procurement process
  - ü Companies plan to assess how effectively equipment minimises risks in DPs
- Expect OEMs and companies to work closer together on new designs - using OMAT

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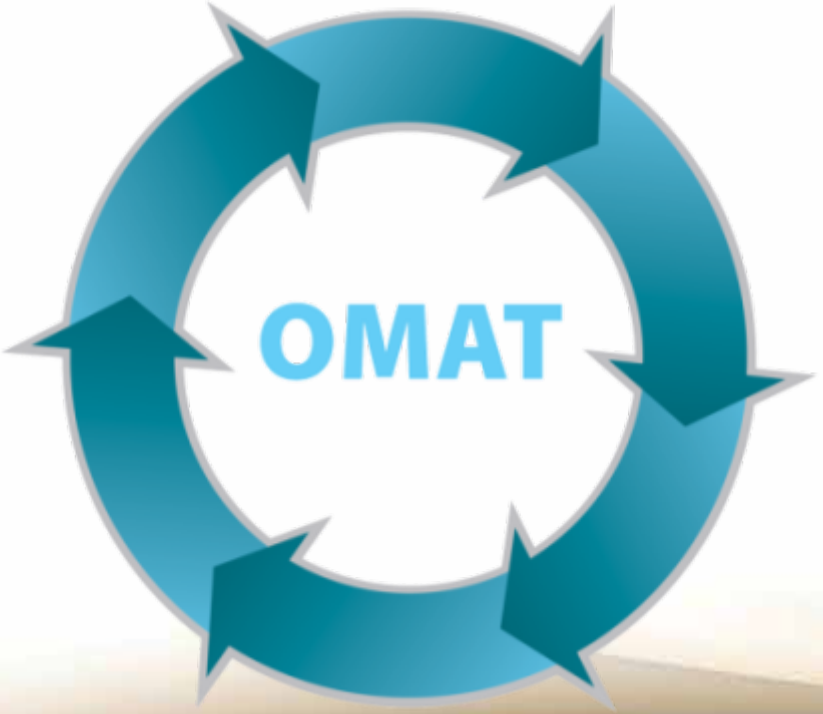
Operability & Maintainability Analysis Technique (OMAT)



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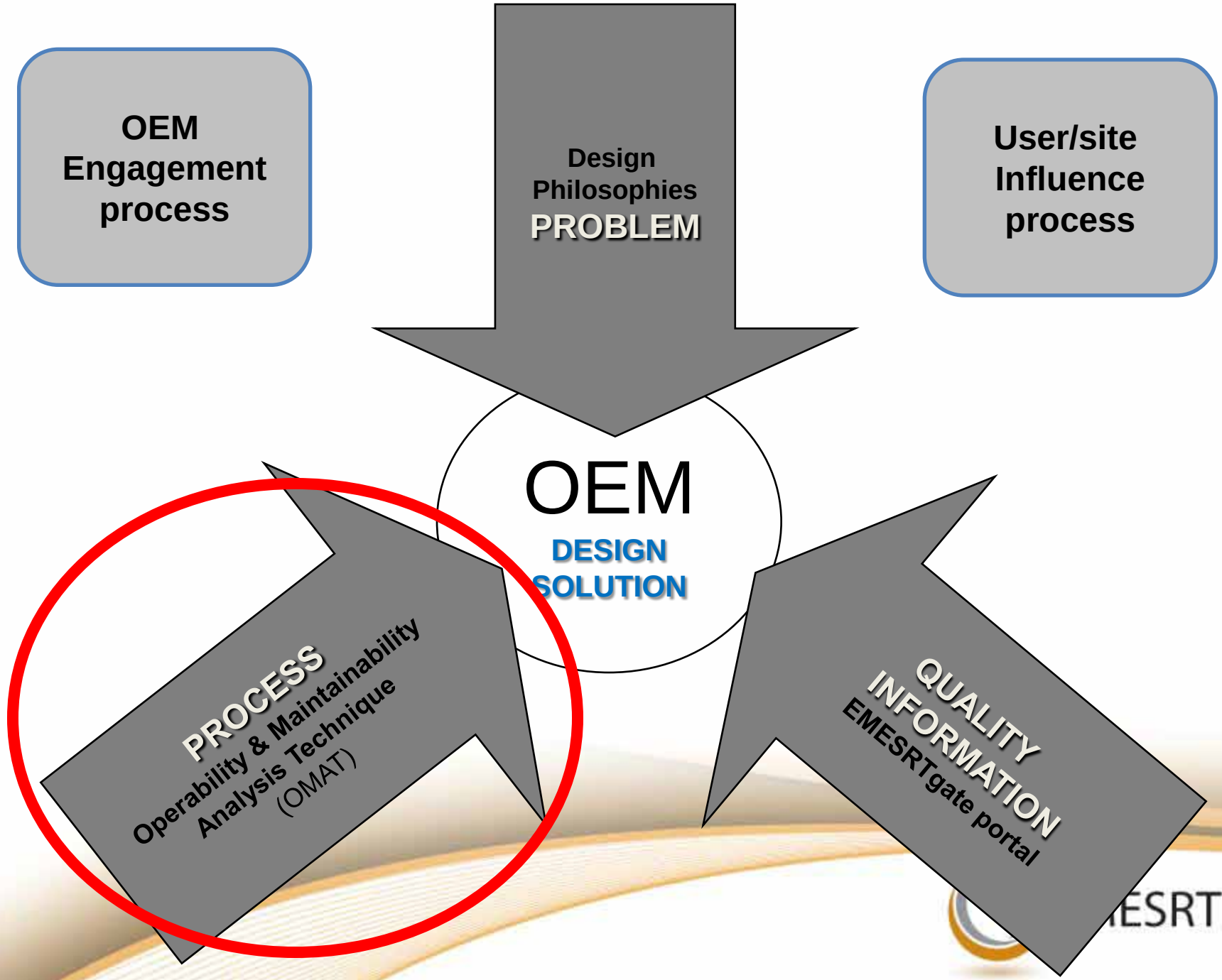
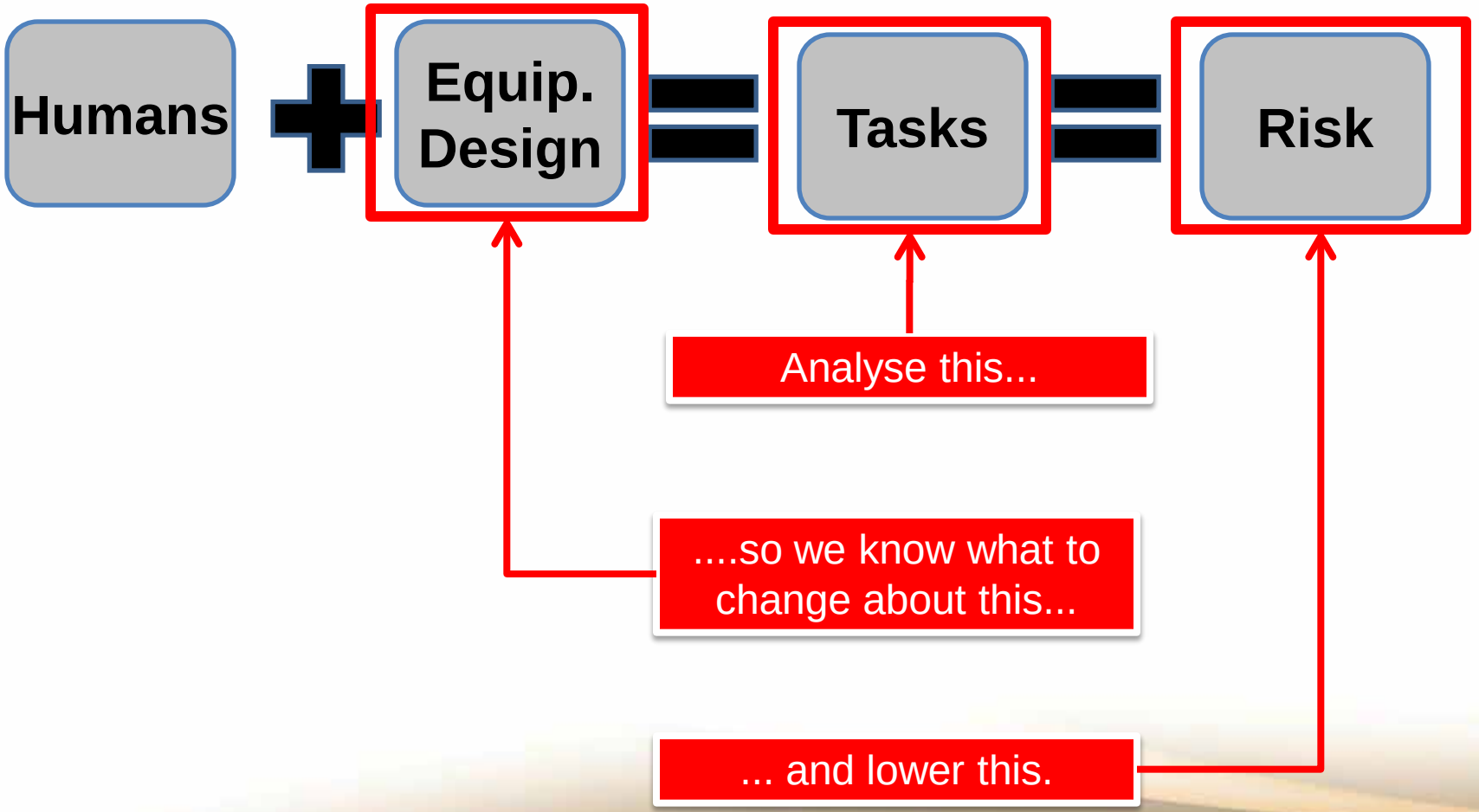

OEM Engagement process
Design Philosophies
PROBLEM
User/site Influence process
OEM
DESIGN SOLUTION
PROCESS
Operability & Maintainability Analysis Technique
(OMAT)
QUALITY INFORMATION
EMESRTgate portal

A task-based risk assessment and design process involving end-users and OEMS



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What do you **do** in an OMAT?

- Critical Task Identification
- Task Flow Chart
- Risk Identification
- Solution Options
- Feedback & Action Plan
- Equipment Risk Register

Task Description	Task Type	Task Frequency	Consequence Input – Key Hazards 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total Priority Score
TASK 1	Oper	6	3	5	2				5									1380
TASK 2	Oper	6	3	5	2				5									1380
TASK 3	Oper	6	2	2		1			5						5			1266
TASK 4	Oper	5	3	5	1		2		5									1155

What do people have to do?

Priority Assessment

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Critical Task Identification

Task Flow Chart

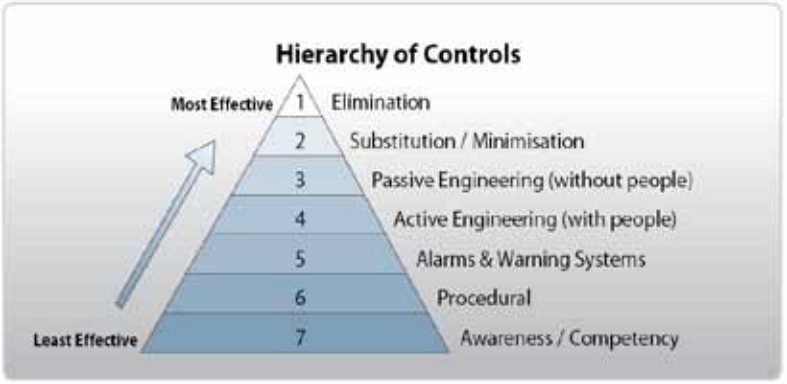
Risk Identification

Solution Options

Feedback & Action Plan

Equipment Risk Register

Task Description	Task Type	Task Frequency	Consequence Input – Key Hazards 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total Priority Score
TASK 1	Oper	6	3	5	2				5									1380
TASK 2	Oper	6	3	5	2				5									1380
TASK 3	Oper	6	2	2		1			5						5			1266
TASK 4	Oper	5	3	5	1		2		5									1155



Likelihood	Consequence 1 Insignificant	2 Minor	Moderate	Major	5 Catastrophic
5 Certain	High	High	Extreme	Extreme	Extreme
4 Likely	Medium	High	High	Extreme	Extreme
3 Possible	Low	Medium	High	Extreme	Extreme
2 Unlikely	Low	Low	Medium	High	Extreme
1 Rare	Low	Low	Medium	Medium	High

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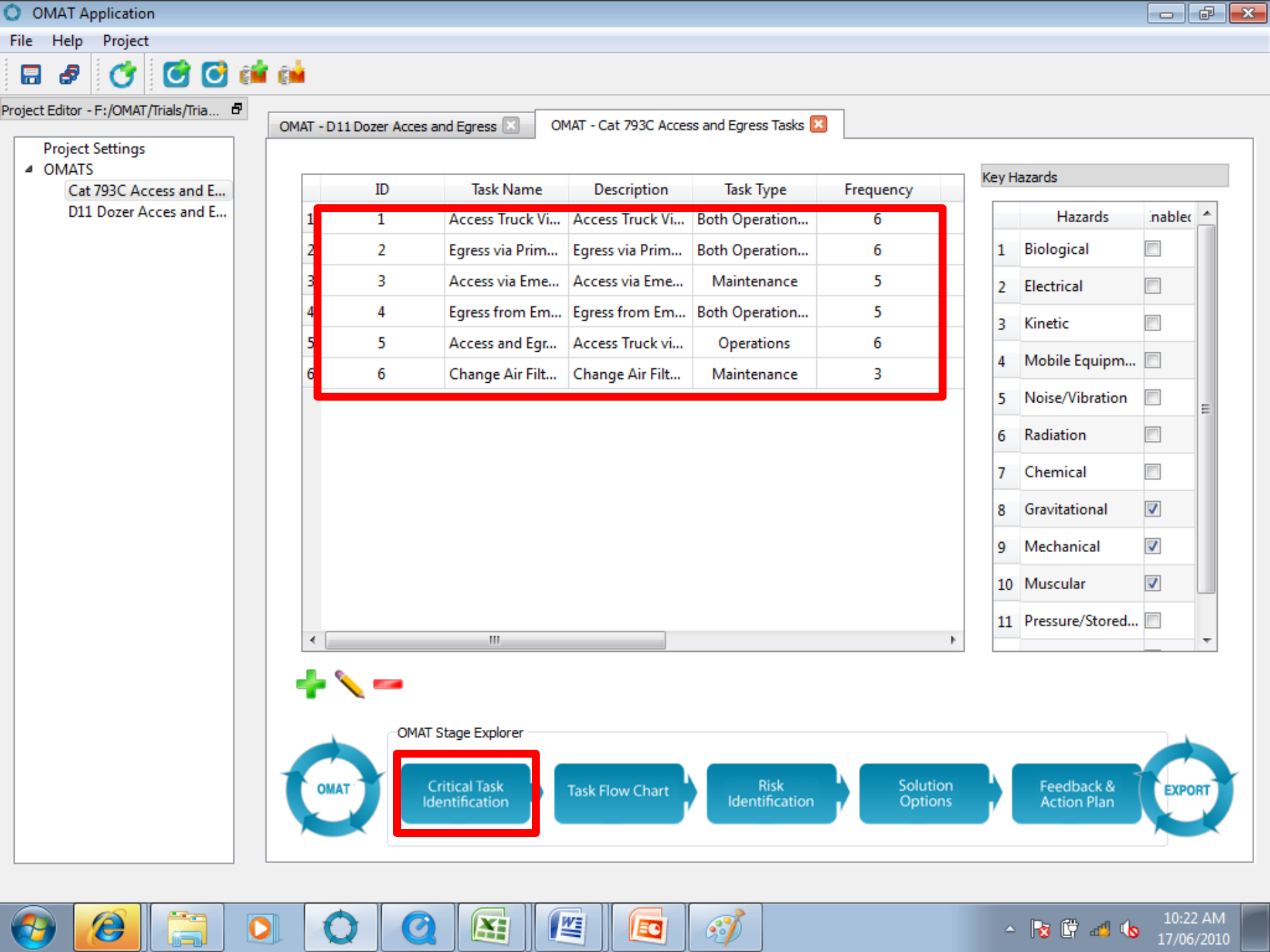
OMAT Software

A working version of the software is available for download from the OMAT section of EMESRTgate (http://www.mirmgate.com/index.php?articleId=36)

Current OEM trials and feedback.


OMAT Application
File
Help
Project
Project Editor - F:/OMAT/Trials/Tria...
Project Settings
OMATS
Cat 793C Access and E...
D11 Dozer Acces and E...
OMAT - D11 Dozer Acces and Egress
OMAT - Cat 793C Access and Egress Tasks
ID
Task Name
Description
Task Type
Frequency
1 Access Truck Vi... Access Truck Vi... Both Operation... 6
2 Egress via Prim... Egress via Prim... Both Operation... 6
3 Access via Eme... Access via Eme... Maintenance 5
4 Egress from Em... Egress from Em... Both Operation... 5
5 Access and Egr... Access Truck vi... Operations 6
6 Change Air Filt... Change Air Filt... Maintenance 3
Key Hazards
Hazards
nable
1 Biological
2 Electrical
3 Kinetic
4 Mobile Equipm...
5 Noise/Vibration
6 Radiation
7 Chemical
8 Gravitational
9 Mechanical
10 Muscular
11 Pressure/Stored...
OMAT Stage Explorer
OMAT
Critical Task Identification
Task Flow Chart
Risk Identification
Solution Options
Feedback & Action Plan
EXPORT
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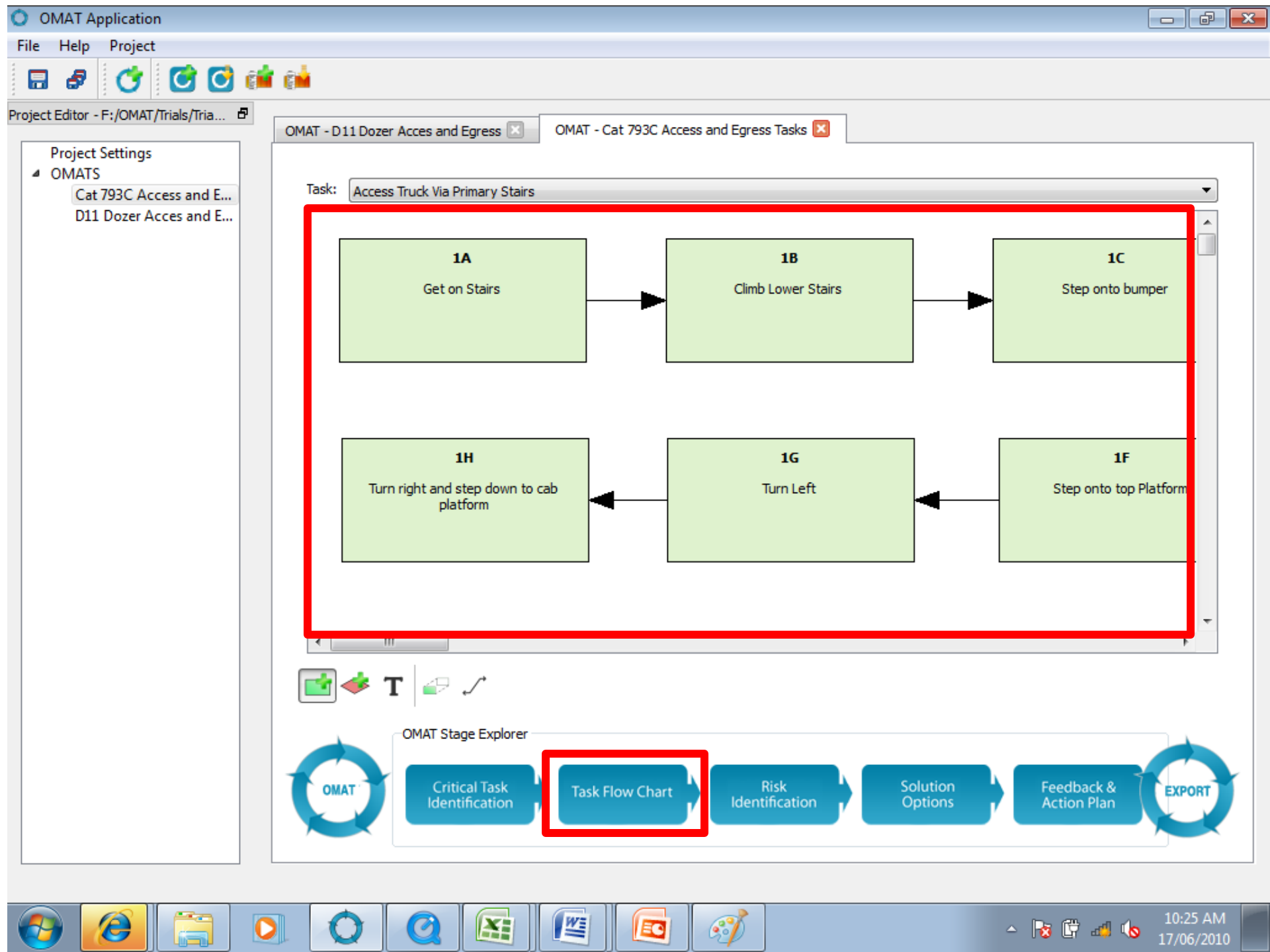
17/06/2010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Project Settings
OMATS
Cat 793C Access and E...
D11 Dozer Acces and E...
OMAT - D11 Dozer Acces and Egress
OMAT - Cat 793C Access and Egress Tasks
Task:
Access Truck Via Primary Stairs
1A
Get on Stairs
1B
Climb Lower Stairs
1C
Step onto bumper
1H
Turn right and step down to cab platform
1G
Turn Left
1F
Step onto top Platform
OMAT Stage Explorer
OMAT
Critical Task Identification
Task Flow Chart
Risk Identification
Solution Options
Feedback & Action Plan
EXPORT
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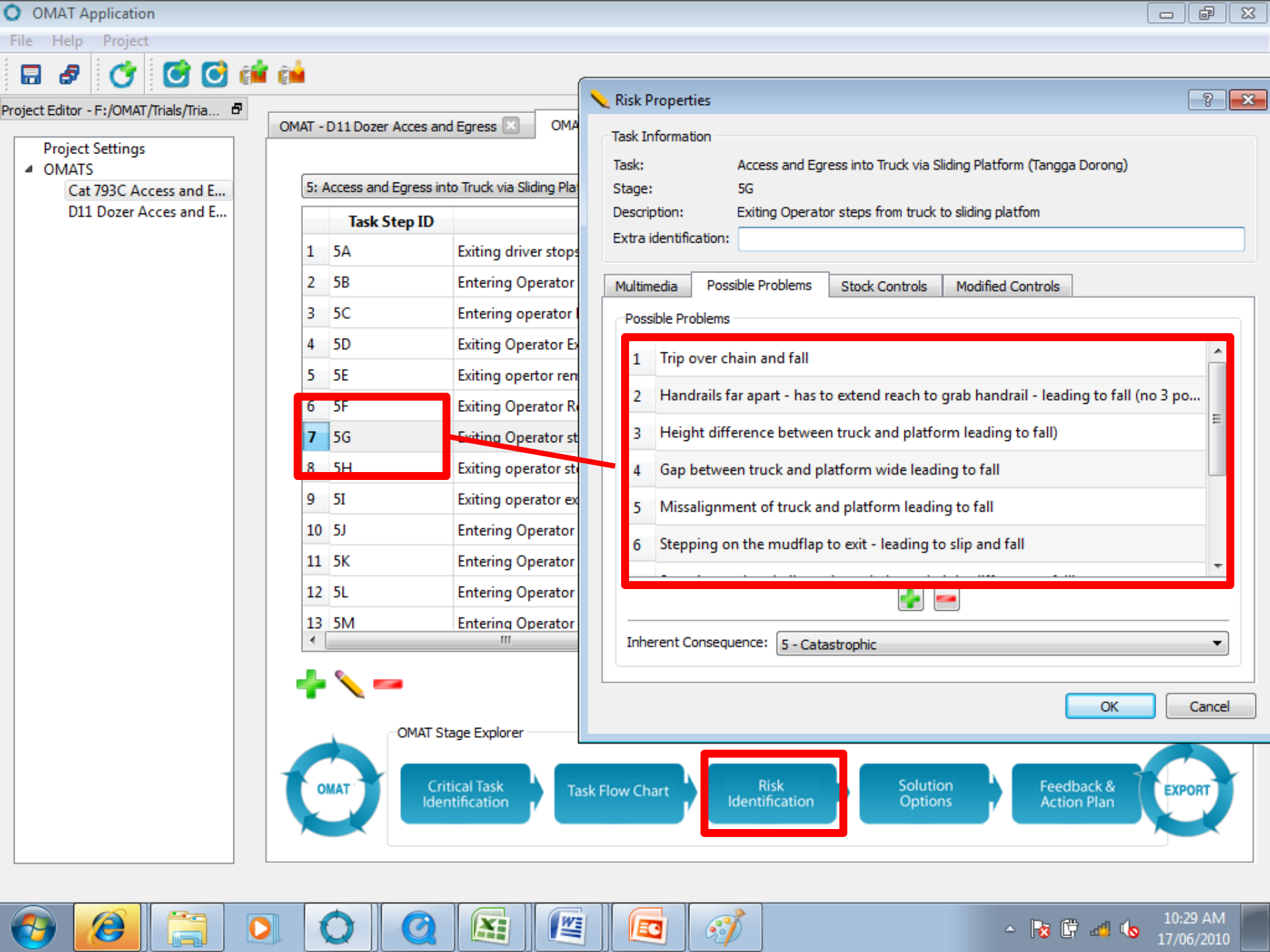
OMAT Application
File
Help
Project
Project Editor - F:/OMAT/Trials/Tria...
Project Settings
OMATS
Cat 793C Access and E...
D11 Dozer Acces and E...
OMAT - D11 Dozer Acces and Egress
5: Access and Egress into Truck via Sliding Pla
Task Step ID
1 5A Exiting driver stops
2 5B Entering Operator
3 5C Entering operator
4 5D Exiting Operator Ex
5 5E Exiting opertor ren
6 5F Exiting Operator R
7 5G Exiting Operator st
8 5H Exiting operator st
9 5I Exiting operator ex
10 5J Entering Operator
11 5K Entering Operator
12 5L Entering Operator
13 5M Entering Operator
Risk Properties
Task Information
Task: Access and Egress into Truck via Sliding Platform (Tangga Dorong)
Stage: 5G
Description: Exiting Operator steps from truck to sliding platfom
Extra identification:
Multimedia
Possible Problems
Stock Controls
Modified Controls
Possible Problems
1 Trip over chain and fall
2 Handrails far apart - has to extend reach to grab handrail - leading to fall (no 3 po...
3 Height difference between truck and platform leading to fall)
4 Gap between truck and platform wide leading to fall
5 Missalignment of truck and platform leading to fall
6 Stepping on the mudflap to exit - leading to slip and fall
Inherent Consequence: 5 - Catastrophic
OK
Cancel
OMAT Stage Explorer
OMAT
Critical Task Identification
Task Flow Chart
Risk Identification
Solution Options
Feedback & Action Plan
EXPORT
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17/06/2010

Examples of Issues and Design Changes

Small chain that did not provide good fall protection...

Extra fall protection added and self closing gate.

AFTER


BEFORE
ATLAS COPCO
Filter difficult to access and time consuming to change

Filter repositioned with hoses – easy to access and fast to change. No damage from operation noted.

AFTER

Future OEM OMATs

At the September 2010 engagement tour virtually all major OEMs announced that they were planning to conduct OMATs on their designs.

EMESRT expects to be involved here by providing end-users and potentially providing support to assist in this process.

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OMAT Software:
http://www.mirmgate.com/index.php?articleId=36

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