Influencing Equipment Design - the European ‘Safer by Design’ Project

by Martin Isles  BSc MSc CGeol FGS FIAT FIQ

Director, Health & Safety, Mineral Products Association, UK
Chairman, H&S Committee, European Aggregates Association (UEPG)
Mineral Products Association is the British trade association for:

- Aggregates (land-won; marine; and recycled)
- Asphalt
- Agricultural Lime
- Cement
- Mortar
- Ready-mixed concrete
- Silica
- Slag
6th Atlantic Alliance Conference:
“Global Initiatives on Safety and Health”
20-21 October 2010, Brussels

Presented to Patrick O’Shea, CEO, Hanson UK by Dr Jukka Takala, Director, EU-OSHA
UEPG Awards, Munich, 27 May 2010
28 Members
26 Countries
3 billion tonnes/year

UEPG aisbl
Rue d'Arlon 21
1050 Brussels
Belgium

Tel: +32 22 33 53 00
Fax: +32 22 33 53 01

secretariat@uepg.eu
http://www.uepg.eu
Statistics: Earthmoving Machinery Analysis


Institute of Mining
Clausthal University of Technology
Department of surface and international mining

Univ. Prof. Dr.-Ing. habil. H. Tudeski
Dipl.-Ing. Matthias Könnecke

- Design-related: 368 cases (33%)
- Operational: 107 cases (10%)
- Not clearly assignable: 650 cases (57%)

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Statistics: ‘Root Causes’ Analysis (100 injury incidents, 2008)

Employees by weighting
Number of Citings

Contractors by weighting
Number of Citings
Machines new in 2007: Examples of Design Challenges

- Easy access to cab? **NO!** (Man is 2m tall)
  - First step is 500mm high and far too flexible

- Safe to clean the windscreen? **NO!**
  - Slippery, sloping surfaces – unsafe foothold

- Safe access to fuel filler? **NO!**
  - Tracks should not be used as access
  - Fuel filler should be accessible from the ground

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‘Safer by Design’: Objectives

- To collate, from Users, voluntary Best Practice Guidance on health & safety features for new and re-engineered mobile plant.

- To work within the European/International standards framework (eg: CEN and ISO standards)

- To ensure ‘Safer by Design’ is communicated effectively to all stakeholders

- To involve the employers, employees and the ‘supply chain’ in working together towards achieving Zero Harm.
‘Safer by Design’: *Plant Categories*

- Loading shovels
- Excavators
- Bulldozers
- Dump trucks
  - Rigid
  - Articulated
- Mobile crushers and screens

*(Thanks, Caterpillar!)*
In 2009, UEPG adopted ‘Safer by Design’ as a UEPG Project

Web pages accessed via:

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Welcome to Safequarry.com

SAFER BY DESIGN
Mobile Plant

REGISTER for email alerts

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Awards won by safequarry.com

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Safer by Design is a groundbreaking project that will reduce injuries and ill-health attributable to poor mobile plant design. Research has shown that even though meeting international safety standards and the requirements of the EU Machinery Directive, a significant proportion of incidents involving mobile plant on mineral producing and processing sites are due to poor design.

User companies and mobile plant manufacturers have cooperated in helping to identify key safety features on mobile plant that represent best practice. The features have been combined into voluntary guidance which recommends core safety requirements for loaders, bulldozers, excavators, dump trucks, mobile crushers and screens.

Operators who commit voluntarily to this best practice guidance will specify some or all of these safety features on new plant purchases. They will also be able to compare their existing plant against the guidance. This ALSF funded project has achieved cross industry support and generated significant international interest from companies involved in minerals extraction. The principles are closely mirrored in other parts of the world, e.g. the global Earth Moving Equipment Safety Round Table (EMESRT) initiative, managed and facilitated in Australia by the University of Queensland.
<table>
<thead>
<tr>
<th>Service points</th>
<th>Description</th>
<th>Machine Size</th>
<th>Checklist For My Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All daily checks capable of being carried out at ground level (electronic readouts can be located in the cab)</td>
<td>✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>All daily checks capable of being carried out from a safe working platform (electronic readouts can be located in the cab)</td>
<td>N/A N/A N/A</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>All daily checks capable of being carried out at a grouped service point at ground level</td>
<td>OPT OPT OPT</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>All daily checks capable of being carried out at a grouped service point from a safe working platform</td>
<td>N/A N/A N/A</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>All service points to be adequately lit and switched from ground level</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>6</td>
<td>Lighting - Engine bay to be adequately lit for servicing with options to switch on or off</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>7</td>
<td>Fuel points - Refuelling from ground level</td>
<td>✓ ✓ OPT</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>8</td>
<td>Fuel points - Refuelling from a safe working platform accessed from a stairway requiring only three points of contact</td>
<td>N/A N/A ✓</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>9</td>
<td>Fuel points - Refuelling point from ground level fitted with Formula 1 type fast fill and connection point, such as Wiggins/Banlow type</td>
<td>OPT OPT OPT</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>10</td>
<td>Service points - Machines to be fitted with an autolube system for all greasing points (except rotating prop shafts)</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>11</td>
<td>Service points - Machine fitted with a facility to remove oils to enclosed containers to prevent an inadvertent spillage</td>
<td>OPT OPT OPT</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>12</td>
<td>Service points - Maintenance hatches shall be designed such that once opened they can be retained in the open position and require positive pressure to close, i.e. they cannot slam shut unexpectedly</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓ ✓</td>
</tr>
</tbody>
</table>
Examples of best practice . . .

Mirrors; Guard-rails; fuel fast-fill

‘Blind-side’ camera

Protected from damage

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From simple low-cost roots . . . to international recognition
Australian Experience

Mobile equipment related accidents are some of the most common accidents in Australian mining. Human error analysis has found that error is often due to equipment design problems, either in operability or maintainability.

Human Factors Engineering (HFE) attempts to fit the system to the person rather than making the person fit the system.

Earth Moving Equipment Safety Round Table

. . . . . an internationally recognised issue!

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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

www.mirmgate.com
EMESRT Engagement Process

Understanding each other better

- Establishing communication
- Providing information
- Asking for input
- Looking for change
- Communicating success

Engagement History

- Caterpillar
- Komatsu
- Hitachi
- Bucyrus / Terex
- Liebherr
- Ingersoll Rand
- Sandvik
- Atlas Copco
- P&H / Joy
Recommended actions:

Joined-up thinking; international co-operation; Users working with manufacturers/suppliers, standards bodies and regulators

SINGLE AIM: ZERO HARM

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a single global issue

Thank you for listening . . .

Contact: martin.isles@mineralproducts.org