

Equipment Overview



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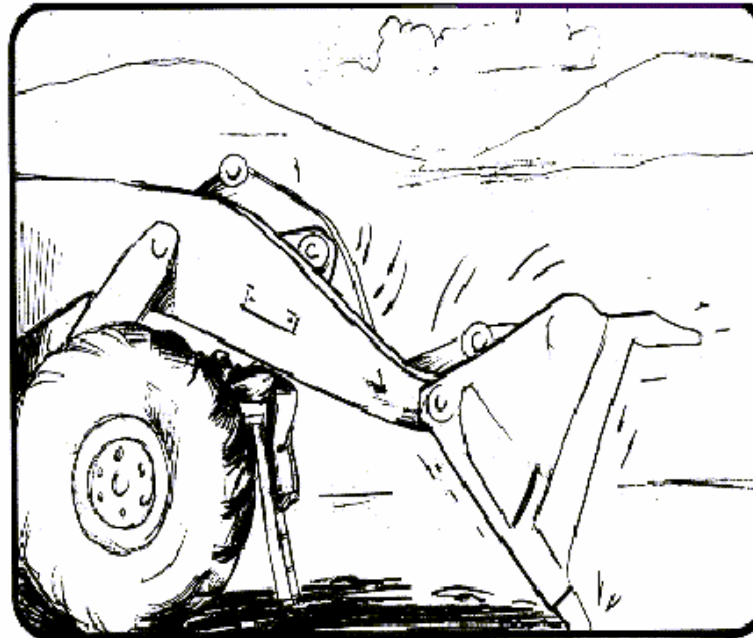
Mine Safety and Health Administration

Today's Discussion

- **Seatbelt Usage/Accidents**
- **Ingress/Egress Accidents**
- **Human Demographics**
- **Potential Solutions including (Europeans)**
- **Overview of MSHA Website**
- **Conclusion**

Fatal Accidents

METAL/NONMETAL MINE FATALITY - On August 1, 1998, a 61-year old mechanic (contractor employee) with no mining experience was fatally injured at an alumina mill. The victim was performing maintenance on the hydraulic system of a front-end loader when a sudden release of hydraulic pressure caused the bucket support arm to fall, pinning him against the loader frame.



Best Practices

- Maintenance should not be performed unless the power is off and machinery components are blocked against hazardous motion.

[MSHA Accident Investigation Report \(click here\)](#)

Fatal Accidents

COAL MINE FATALITY - On Thursday, April 21, 2005, a 22-year old contractor employee (Field Service Technician), with 27 months total experience, was fatally injured while repairing a Caterpillar 980 G front-end loader. The victim was working in the articulation area of the front-end loader when it unexpectedly pivoted, crushing the victim within the pinch point.



Best Practices

- Never work or travel in the loader's articulation area without engaging the steering frame lock or without using another effective means of preventing motion if the lock cannot be used.
- Lower the bucket and shut-off the machine before performing maintenance.
- Follow the manufacturer's guidelines and recommended procedures for safe repair and maintenance of equipment.
- Observe and follow all warning labels and signs on equipment.
- Include safe procedures for repair and maintenance of equipment in training programs.

[MSHA Accident Investigation Report \(click here\)](#)

MSHA Incident Reduction Program for Operators and Contractors

- Voluntary Program Administered by MSHA Technical Support, Applied Engineering Division
- Includes employee interviews, observations, accident analysis, and root cause analysis
- Year long process with quarterly reviews
- Since program inception in 2002, NFDL rates reduced by 44 % for 23 participating operations.
- Contact you local MSHA District Office to volunteer for this program.

A Solid Foundation for a Company Safety Culture Must Include:

■ Zero Tolerance for

– Drug / Substance abuse



– Not wearing seatbelt



– Entering a Red Zone near suspended loads



– Failing to block against motion



Example Narratives of Citations

56.14100(b) (Defects)

There was no brake light or left rear turn signal operable. Defects that affect safety shall be corrected in a timely manner to prevent the creation of a hazard to persons. Miners exposed to these type of hazards will be expected to receive injuries that will cause lost workdays or restricted duty in the event of an accident.

56.14100(b) (Defects)

The IMT 5016 boom did not have a safety latch on the boom's hook. This IMT boom was located on the contractors, Empire's C7500 GMC Service Truck Co. The hook had a forged hole where the safety latch once was attached. This safety latch is necessary to prevent hoisted loads from coming free of the hook and falling on a person below. The mechanic lead man said that he has been on vacation for the past two weeks and no one else operates this truck and he was unaware when the safety latch had broken off of the booms hook. If it had been used more frequently, the likelihood of an accident occurring would increase.

Things To Remember

- If it is on mine property, it is subject to inspection.
- The training exclusions in Parts 46 & 48 do not excuse anyone from being inspected.
- If you are performing services or construction at a mine site you are required to obtain an ID.

MSHA Has Two Major Areas of Concern For Surface Equipment,

Seatbelt Usage



Ingress / Egress



Seatbelt Usage

From 2001 – April 2006 there were 33 fatalities involving mobile equipment where miners did not have a seat belt on.

Of these 33 fatalities, 25 victims (76%) may have survived had they been wearing an adequate seatbelt.

Of the 25 victims, 20 had an adequate belt provided. Two were defective, and three were not provided.

If adequate seatbelts are worn, it is possible that four to five miners lives could be saved each year!

INGRESS/EGRESS

**Getting On/ Off Equipment
Accident Information**

Equipment Manufacturer Accident Data for Getting on/off Equipment (2001 – April 2006)

Top 5 Manufacturers	# Accidents
Caterpillar	1,317
Komatsu	173
Mack	119
Ford	105
Euclid	100
Others listed	633
Unknown/unlisted	3,333
Total No. Accidents	5,780

**Of the manufacturers listed, CAT Equipment
accounts for 54 % of the accidents.**

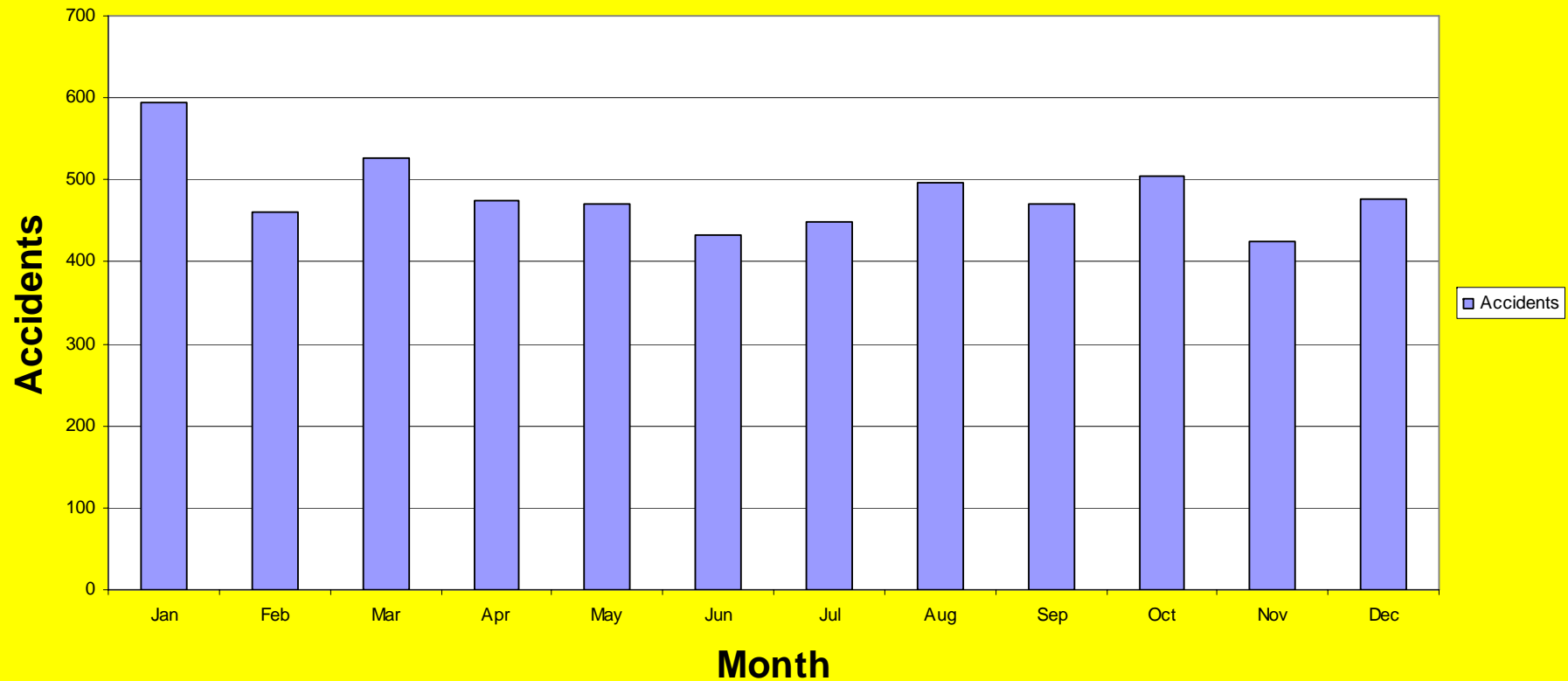
CAT Equipment Involved in Getting on/off Equipment Type Accidents (2001 – April 2006)

Top 10 Models #	# Acc.
980 G	41
988	31
988B	30
992	28
988F	27
992C	27
777	26
777B	23
785	22
980	21



On / Off Equipment Injuries (2001 – April 2006)

Ingress/Egress Accidents by Month



Accidents by Occupation for All Miners (Get on/off) (2001 – April 2006)

■ Mechanics	15%
■ Truck Driver	13%
■ Laborer / Utility	12%
■ Bulldozer Operator	12%
■ Front-End Loader Op.	9%

Effects of Age for Getting On / Off Equipment Injuries (2001 – April 2006)

<u>Age</u>	<u># Accidents</u>
<18	1
18-24	449
25-34	1227
35-44	1414
45-54	1724
55+	838
no age given	127

Human Demographics

Losing your grip?

Right Hand (dominant)

age 30 99 lb.
age 50 92 lb.
age 60 86 lb.

Left Hand

age 30 64 lb.
age 50 58 lb.
age 60 48 lb.



Human Demographics

Facts and Tidbits.....

There are 16 million Americans age 55 and older working or seeking work.

Between 2000 and 2010 the fastest growing age group will be between 55 and 64.

In the age group of 70 to 74, one in eight is employed either full or part time.

Human Demographics

According to The National Institute for Occupational Safety and Health

The rate of fatal injuries per 100,000 workers are

- 15 for workers 65 and older**
- 5 for workers 25 to 34**

Can We Make Access Safer ??



Can older equipment be retro-fitted with stairs to match newer equipment ?



Potential Retro-Fitting Access Solutions??



Mining companies are concerned with liability and warranty issues if they change a manufacturer's design.

Over Seas Proposed Solutions

- **European Alliance comprised of representatives from Manufacturing, Suppliers, Unions, Operating Companies, Academia and Government**
 - Found significant volumes of accidents are still being generated from the use, maintenance, and interaction of pedestrians with mobile equipment.
 - Europeans believed safety can be improved on their equipment if the following safety features are implemented at the design stage. Retro-fitting solutions should be considered too.
 - Operating companies and manufacturers must work cooperatively together.

Over Seas Proposed Solutions

Applicable for all Types of Mobile Equipment

EXAMPLES:

Seat Belts - A suitable seatbelt needs to be fitted and routinely worn by the operator. A visible green warning light should be fitted in a prominent location to signify the belt is being worn.

Ingress / Egress – access to the cab of the machine should be achieved by an inclined stairway.

Minimum tread depth of stairs is 400mm and maximum depth of 700mm.

First step of the stairway needs to be fixed, when in use, and should be the same height as the rest of the stair treads to reduce injury due to over-stretch.

Over Seas Proposed Solutions

Maintenance Activities – All standard maintenance functions such as re-fueling, lubrication, greasing, etc. should be able to be performed at ground level.

Access to engine compartments to facilitate maintenance activities should be considered at the design stage. Suitable means of access should be provided and walkways/working platforms fitted.

Visibility – when seated in the driving position, the operator should see a 1 meter high object 1 meter out from the machine and have 360 degree vision.

Other - Automatic fire protection systems to safeguard both the operator and engine compartment.

Over Seas Proposed Solutions

Other - A warning device needs to be fitted fully audible or visible to the driver indicating the body of the truck is in a raised position.

Other - Brake testing equipment should be considered and fitted to the machine when the need for brake testing is frequent.

Summary and Conclusions

- Human and Work Force Demographics indicate Ingress/Egress and Seatbelt accidents will continue to increase at an accelerated rate without vigorous Engineering Intervention.
- Without appropriate engineering solutions, history indicates equipment accidents will continue to be a primary cause of injuries.

MSHA Website



Safety and
Health are
Values!

www.msha.gov

- Accident Prevention
- Fatalgrams
- Hazard Alerts
- Equipment Information
- Contact Information (Enforcement, Educational Field Services, & Technical Support)

Thank You!!!