MAN-MACHINE INTERFACE RISK ASSESSMENT

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WHAT IS MMI?

- Interaction between man and machine

vs

- High Severity
- Usually fatal

High Severity

- OSHA Stats (fork trucks):
  - 85 fatalities per year
  - 34,900 serious injuries per year
  - 36% of fork truck fatalities involved a pedestrian

MMI Objective

- Evaluate / identify MMI hazards
- Document existing controls
  - Risk rank hazards
- Recommend additional controls
  - Risk rank hazards
- Establish a consistent process to assess and control MMI risk.

MMI Benefits

- Engineering Controls
  - Improve segregation between man and machine
  - Physical barriers
  - Consistency in physical standards
- Administrative Controls / Warning
  - Improve alert/awareness of mobile equipment
  - Training and communication
  - Warning signs, lights, alarms, etc.
- PPE
  - Improve visibility of pedestrians

What EnSafe can provide

- Customize client specific MMI form
- Conduct MMI Risk Assessment Leader Training
- Lead MMI Risk Assessments

MMI Risk Assessment Form

- Tool to assist / document assessments
- Identify existing controls
  - Risk rank
- Recommend additional controls
  - Risk rank

Recommended Control Measures

Recommended Additional Control Measures	
Control Methods and Reliability	Examples of Risk Reduction Measures
A. Engineering Controls (fully effective to eliminate or mitigate hazard or risk)	A.1 Redesign process or task to eliminate MM interface
	A.2 Use alternative material-handling methods (i.e. conveyors, robots)
	A.3 Reroute mobile equipment and pedestrian paths to eliminate MM interface
	A.4 Relocate or install pedestrian or equipment doors
	A.5 Govern speed of mobile equipment to </= 5 mph
	A.6 Install physical barriers to segregate pedestrians from mobile equipment
	A.7 Install one-way spring-loaded gates at pedestrian crossings
	A.8 Equip mobile equipment with interlocked seat belts or audible alarms
B. Administrative Contols (partially effective to mitigate hazard or risk)	B.1 Establish and mark safe traffic control patterns
	B.2 Install mirrors at blind spots and intersections
	B.3 Install front and back mounted cameras on mobile equipment
	B.4 Install laser light on mast of lift trucks to guide forks
	B.5 Establish a "halo rule" that requires mobile equipment to be shut off when within 5 feet of unprotected pedestrians
C. Warning Systems and Work Practices (complement to engineering and/or administrative controls but ineffective independently to mitigate hazard or risk)	C.1 Install PSDI warning lights prior to pedestrians entering the path of travel
	C.2 Equip mobile equipment with audible alarms, lights, beacons, strobes
	C.3 Establish rule to sound horn at intersections and blind spots
	C.4 Install blue lights on mobile equipment (front and back)
	C.5 Install signs at blind spots and intersections
D. Training and/or PPE (complement to engineering and/or administrative controls but ineffective independently to mitigate hazard or risk)	D.1 Provide mobile equipment operator training
	D.2 Develop and implement a pedestrian training package (onboarding and routine)
	D.3 Follow up training regarding use of impact sensors
	D.4 Establish a rule to differentiate the status of pedestrians by hard-hat color
	D.5 Procure and implement the use of reflective/high-visibility garments on all personnel

Safety and Health Risk Definitions

- **Severity:** How bad will someone get hurt
- **Probability (or frequency):** How often does activity occur
- **Control Modifier (or likelihood):** How effective are existing controls
  - Considering controls: engineering, administrative and PPE
- **Risk Rate:** The numerical value of risk determined by multiplying Severity **X** Probability **X** Control Modifier.
  - Different risk matrix can be used
  - Rank before and after assessment

Safety Risk Grid

Customized to your standard

SEVERITY					
		Death, disability, and work loss	Loss of work (LTA)	Medical treatment restricted work	First aid supply
		Severe property damage +250 K	High property damage $50K-$250K	Moderate property damage -$50K	Low property damage
		Severe environmental impact release into community	High environmental impact contained within property boundaries	Moderate environmental impact contained within immediate area	Low environmental impact
PROBABILITY		10	7	4	1
Very high, very probable, constant exposure	10	100	70	40	10
conceivable, probable, frequent exposure	7	70	49	28	7
Moderate occasional exposure	4	40	28	16	4
low infrequent exposure	1	10	7	4	1

MMI Recommendations

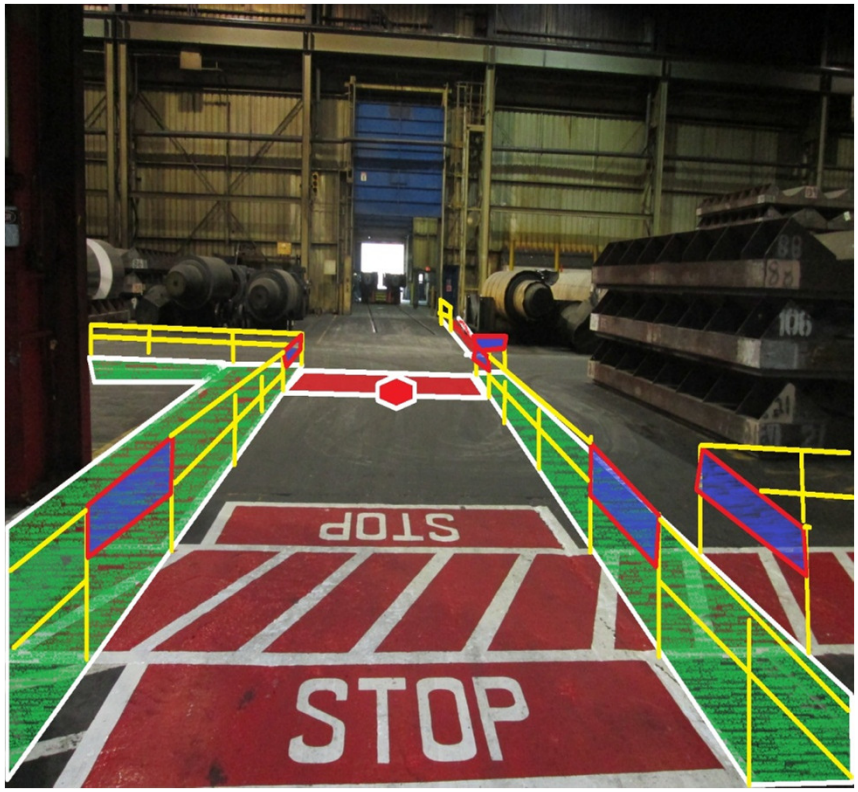
- Before

- After

MMI Recommendations

- Before

- After



MMI Recommendations

- Before

- After

Deliverable

- Report including:
  - MMI risk assessment overview, findings, conclusions
  - Risk assessment forms including before/after rankings following recommended measures
- Training

- 2- Bayless MMI Assessments - Example.xlsx

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