



**IEA**  
VANCOUVER  
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International Ergonomics Association  
21<sup>st</sup> Triennial Congress

# HFE IN EVER-CHANGING INDUSTRIAL SCENARIO



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# Objective

- Inclusion of Human Factors and Ergonomics (HFE) in early design phase reduces cost, improves safety and well-being
- In reality, inclusion of HFE principles/involving HFE experts happens reactively
- Through real-world case scenarios present paper re-emphasizes need of HFE and its inclusion at early design phase





## Approach & Method

Real-life case scenarios of Company-A and Company-B

‘Company-A’ : a global large manufacturing facility producing insulated panel/structure & ‘Company-B’: food processing company

In both cases, reactive approach was adopted after reporting some type of MSD



## Approach & Method

**Problem identification:** Problem definition, Recording of existing scenario, Exploration

**Analysis:** Analyzing existing situation, Postural analyses (REBA)

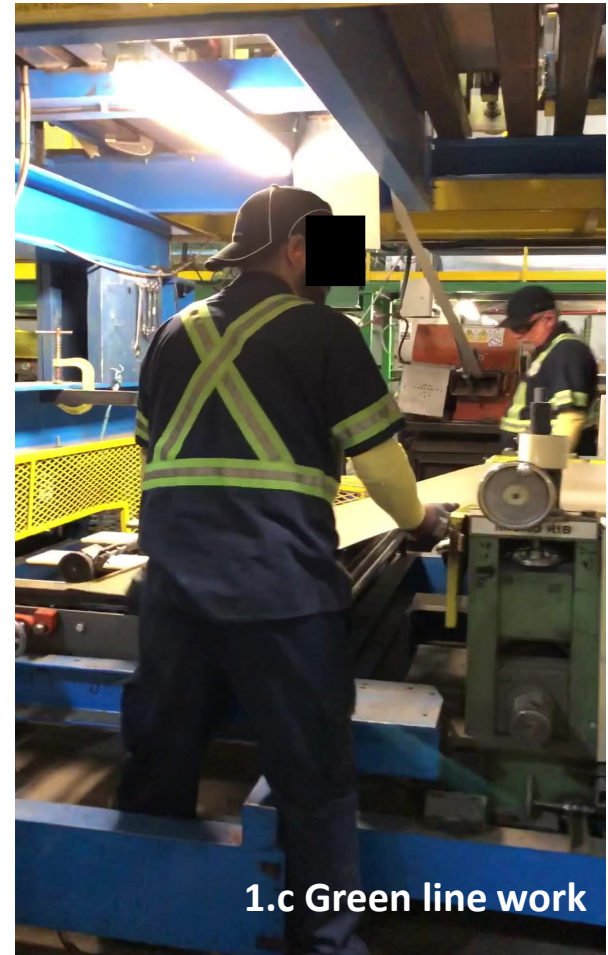
**Recommendation:** Providing report with recommendations/Providing possible MSD control solutions



1.a Trimline



1.b Blue line



1.c Green line work

**Fig.1 Operation lines under assessment at Company-A**



**Fig.2 Operation lines under assessment at Company-B**



# Results & Outcomes

In both cases physically demanding and highly paced jobs

Frequent MSD incidents/complaints reported regularly in certain job areas

Company-A: Blue line jobs reported as high risk; REBA performed on all four tasks

Company-B: REBA performed on almost all jobs, as reported risky

Several workstation design-issues and risk factors were identified in both cases



# Results & Outcomes

## Company A

**General issues:** Workstation design limitations- anthropometric mismatch, inadequate space allocation, poorly designed assembly components

Poor posture & work methods, Static posture with twisting, bending (both upper and lower body), forceful exertion of various body parts

Workers required to move fast (semiautomated system) within inadequate space : potential risk of accidents





# Results & Outcomes

## Company B

**General issues:** Repetitive motion of hand-arm-wrist, static body posture with twisting, forward bending, trunk flexion and rotation

Reaching overhead, neck flexion, wrist flexion/extension/pinching/gripping. Postures were adopted while handling loads (> 120 lb.)

System & workstation design issues (poorly designed assembly components/badly arranged workstation components/space allocation/poor anthropometric considerations)

# Results & Outcomes

	Company-A (Blue line jobs)	Company-B (All jobs)
Level of MSD Risk (REBA score)		
Low risk (2-3)		
Medium risk (4-7)	LF*	
High risk (8-10)	BM, SRP*	MC, P**
Very high risk (11+)	GS*	MP, LD**

\* Lamella Flipper (LF), Blue line Mill (BM), Glue station (GS), Scrap Removal & Packaging (SRP)

\*\*Meat Processing (MP) Meat cutting (MC) Packaging (P) Loading Dock (LD)



**Fig.3 Loading Dock (LD) activities at Company B**

# Recommendations

Recommendations	Company
Establish ergonomics program as a part of company goal to proactively control MSI risks & reduce claim costs	Company A & B
Designing out risks when possible : engineering & administrative controls	Company A & B
Redesign/install adjustable workstations; position work/workstation to reduce awkward postures, promote neutral postures	Company A & B
Consider engineering changes for Blueline (Fig.1b); Involve HFE professional.	Company A
Consider engineering changes: automatic carcass movement (Fig. 2, 3) to control MSD risks, Involve HFE professional.	Company B
Height adjustable carts for scrap removal to avoid awkward hand/body movement. Keep floor clutter free & provide stable/adjustable step stools to avoid reaching above shoulder	Company A
Reduce work surface depth (consider work envelop) to avoid excessive leaning/reaching (when materials reaching through conveyors).	Company B
Ergonomic height adjustable lift tables/arrange materials to arrive on pallets. Keep/store materials (at standing elbow height) on scissor lift tables during loading/unloading. Use mechanical devices (e.g., lifts, hoists) whenever possible (Fig. 3).	Company B

# Recommendations

Recommendations	Company
Handheld ergonomic tools to supports neutral hand/wrist position while cutting meat. Implement knife-sharpening program.	Company B
Establish systems to rotate workers between tasks to minimize effects of continuous exertion, repetitive motion, awkward postures.	Company A
Incorporate stretching session /micro breaks for meat cutting. Establish systems to rotate workers (add more trained meat cutters) between tasks.	Company B
MSD-RTW program: Additional care & strategy is required to accommodate worker suffered from past MSD injuries. Establish early MSD symptoms reporting system.	Company A & B
Involve employees throughout change process to minimize resistance & improve acceptance.	Company A & B
Establish ergonomics training that is specific to the job to make workers aware of MSD hazards and ways to control them	Company A & B
Train workers on biological hazards (symptoms/PPE/ hand hygiene).	Company B



## Discussion

Company-A: used report (finding/recommendations) to justify modification of work-station design. Company-B tried to comply with WSBC orders (OHS 4.48 and OHS 4.50)

Management focused on one factor at a time (improving productivity through automation/employee motivation).

More holistic approaches are more successful than one-dimensional approaches



## Discussion

Inclusion of HFE at an early stage of design will help saving more and getting better ROI;  
Improved productivity, system safety

We as practitioners had not much influence on next step, organization policy/ how report  
would be utilized

HFE linked to OHS regulations: ergonomics considered as additional component/ not as part  
of company strategy, business goals and planning

Focus on WMSDs has been a contributing cause of the underuse of ergonomists/  
ergonomics expertise within industry besides several other reasons.



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manufacturing  
Safety Alliance of BC



## Conclusion

- Re-emphasizes importance of considering HFE at the design stage in the manufacturing sector
- Two real world cases: industry responses are still reactive when it comes to the control of MSD risks.
- HFE has lot to offer beyond risk assessment by addressing major business and societal challenges.
- Regulatory bodies, HFE practitioners and industry stakeholders should come together and continue the discussion



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# Thank You!





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# Questions?

