Engineering Controls for SARS Cov-2 in the Transportation Sector

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Outline

• Engineering Controls for SARS COV-2
  • Distancing
  • Ventilation
• Focus on the importance of worker involvement
  • What have been some major concerns
  • What Hurdles still exist
• Sick and Susceptible Stay Home

• Maximize ventilation
• Maximize physical distance
• Disinfection

• Signage

• Train and train and train and train and train
• Mandatory face coverings.
Temperature Scan Concerns

“Why is this information Needed”

• Reassure workers that temperature scan is for entry purposes only
  • Data is not permanent record or available on internet
  • “the scanner is NOT connected in the internet. Files are deleted end of shift”

• There have been elevated temperatures found at some UAW facilities that have lead to quarantine.
Break Areas

Signage

Better: Barriers
Company goal before reopening

Each site shall make a risk-based determination, for the various tasks performed, to identify tasks where social distancing is challenging to maintain at all times. Work stations shall be configured to include 6-foot distancing between employees. Consider temporary physical barriers between work stations.
Process Evaluation Assembly

Example Truck Plant

• What was the interaction level of each job? Would it require working within 6ft of one another?
• If yes, would a change to the SWI prevent this <6ft risk?
• If not, would a change to the Work Station prevent the risk of <6ft risk?
• If not, would a “Station Curtain” suspended above be able to divide the work area?
• If not would a “Chassis Guard/Barrier” mounted to the chassis provide protection to mitigate risk?
• If not would a “Tool Guard/Barrier” mounted to a crane or tool provide protection?
• If none of the above worked we deemed the job to have an additional PPE requirement
<table>
<thead>
<tr>
<th>Group Jobs (OU 490)</th>
<th># Employees for each Job (only OU 490)</th>
<th>Status</th>
<th>Shared tools?</th>
<th>Time % of conflict</th>
<th>Increase Taht Time</th>
<th>Alternate/Additional Process</th>
<th>PPE Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIRING (LEFT)</td>
<td>1</td>
<td>6 feet side by side</td>
<td>No</td>
<td>85%</td>
<td>Same</td>
<td>Will have a plastic drop dividing the jobs and creating a barrier</td>
<td></td>
</tr>
<tr>
<td>Wire (ALT)</td>
<td>1</td>
<td>6 feet side by side</td>
<td>No</td>
<td>85%</td>
<td>Same</td>
<td>All wiring will do trans wiring due to have plastic drop from above structure to separate people</td>
<td></td>
</tr>
<tr>
<td>Trans Wiring</td>
<td>1</td>
<td>6 feet side by side</td>
<td>No</td>
<td>85%</td>
<td>Same</td>
<td>Will have a plastic drop dividing the jobs and creating a barrier</td>
<td></td>
</tr>
<tr>
<td>BATTERY Cable</td>
<td>1</td>
<td>No Conflict</td>
<td>No</td>
<td>50%</td>
<td>Yes</td>
<td>Will be eliminated on 50 rate</td>
<td></td>
</tr>
<tr>
<td>WATER PLUMB/B-C</td>
<td>1</td>
<td>6 feet side by side</td>
<td>Yes</td>
<td>100%</td>
<td>Yes</td>
<td>Will not be in conflict with social distancing once the above job is eliminated</td>
<td></td>
</tr>
<tr>
<td>Waterpluming 2</td>
<td>1</td>
<td>6 feet side by side</td>
<td>No</td>
<td>100%</td>
<td>Yes</td>
<td>Going to stagger the left and right employees and move one down a station on the line to create separation.</td>
<td></td>
</tr>
<tr>
<td>CAC LH</td>
<td>1</td>
<td>6 feet side by side</td>
<td>No</td>
<td>85%</td>
<td>Same</td>
<td>Going to stagger the left and right employees and move one down a station on the line to create separation.</td>
<td></td>
</tr>
<tr>
<td>CAC RH</td>
<td>1</td>
<td>6 feet side by side</td>
<td>No</td>
<td>85%</td>
<td>Same</td>
<td>Going to stagger the left and right employees and move one down a station on the line to create separation.</td>
<td></td>
</tr>
<tr>
<td>RAD SWING RH</td>
<td>1</td>
<td>6 feet side by side</td>
<td>No</td>
<td>100%</td>
<td>Same</td>
<td>Still under investigation and looking for possible solutions</td>
<td></td>
</tr>
<tr>
<td>RAD SWING LH</td>
<td>1</td>
<td>6 feet side by side</td>
<td>No</td>
<td>100%</td>
<td>Same</td>
<td>Still under investigation and looking for possible solutions</td>
<td></td>
</tr>
<tr>
<td>P/S BUILD UP</td>
<td>1</td>
<td>No Conflict</td>
<td>No</td>
<td>0%</td>
<td>Same</td>
<td>Building another build up table so that the employees can each build radiators separately</td>
<td></td>
</tr>
<tr>
<td>HOSES BU</td>
<td>1</td>
<td>No Conflict</td>
<td>No</td>
<td>0%</td>
<td>Same</td>
<td>Building another build up table so that the employees can each build radiators separately</td>
<td></td>
</tr>
<tr>
<td>WATERSPIDER</td>
<td>2</td>
<td>No Conflict</td>
<td>Yes</td>
<td>0%</td>
<td>Same</td>
<td>Building another build up table so that the employees can each build radiators separately</td>
<td></td>
</tr>
<tr>
<td>RAD BU</td>
<td>2</td>
<td>6 feet side by side</td>
<td>Yes</td>
<td>100%</td>
<td>Same</td>
<td>Building another build up table so that the employees can each build radiators separately</td>
<td></td>
</tr>
<tr>
<td>RAD FINISH</td>
<td>1</td>
<td>No Conflict</td>
<td>No</td>
<td>50%</td>
<td>Same</td>
<td>Building another build up table so that the employees can each build radiators separately</td>
<td></td>
</tr>
</tbody>
</table>
Line Speed considerations

- On start up the target for large assembly plant was 10 trucks per day
- 30 trucks were produced
- Full production is 79 trucks per day
- Evaluation of physical distance conflicts took line speed into consideration
  - But full production still creates spacing conflicts
Example of Physical Barrier
Difficult work spaces
Two person Task in Confined Area

• With circulating fans and air conditioning off workers face covering use declined
• Workers dropped out from heat stress
  • UV radiation being used inside to decontaminate Truck Cabs
  • Planned tunnel for UV radiation on Chasis line
Two person jobs: Ergonomic considerations for Lifting and Assembly

Photo source: New York Times
Ventilation Concerns

Concerns

- Air conditioning and filters improved
  - Maximize MERV filtration
- Floor fans running
  - Necessary for cooling
- Run ventilation continuously
- Some plants opening loading dock doors
  - Many UAW facilities do not have air conditioning

Examples of Plants’ Varied in MERV filtration (Same Company)

Plant 1:
- Prefilter – MERV 8
- 2Nd Stage Filter – MERV 10
- Final Filter – MERV 13 or 15

Plant 2:
- MERV12
But working with filter supplier to boost that up to MERV16 (highest we can go) on the majority of the roof-top units.

Plant 3
- MERV 9 is prefiter and MERV12 is the final filter.
Multi-stage filters

Best performing plant

Plant 1:
- Prefilter – MERV 8
- 2\textsuperscript{nd} Stage Filter – MERV 10
- Final Filter – MERV 13 or 15
Figure 5.16. Schematic of a self-cleaning cartridge filter. Reproduced with permission from Pymowest AB.
Clean Air Distribution

• Once you filter and condition the air how do you distribute it to eliminate entraining virus?
Concentrated Air Supply with Directing Air jets

Concentrated air supply with horizontal and vertical directing jets. Goteborg, Sweden
Ventilation Controls for Machining Fluid
Myco-bacteria
NIOSH HHE

- Report describes a number of engineering controls
- Raises questions about some practices
  - Validates some ventilation adjustments
  - Serious questions on illness surveillance
Ventilation Improvements
Validated by NIOSH

Right angle extension for exhaust
New Fresh Air drop

Fresh air plenum delivered in stagnant area where
Bad Practice

Putting filter material over the end of the exhaust for the mist collector
NIOSH reports point out ineffectiveness
Exhaust discharge equipped with angled vent
Local Exhaust Ventilation

Photo published in 2000.
(We know how to do this)

Note Barrier Guard and downdraft

• “Unidirectional flow ventilation for the polishing and grinding operation at DaimlerChrysler body shop in Sindelfingen. Air is supplied through special panels with low velocity and low turbulence and is extracted through square opening in the floor with grating cover. Two work places located on each side of the car body are separated with plastic curtain to prevent cross contamination.”

Ventilation Guide for the Automotive Industry Page 24
Face shield with Fan and Filter

Workers concerned with fogging of eyewear. Created with on-site 3D printer.