

IMPROVING SORTING STATION

PROBLEM STATEMENT

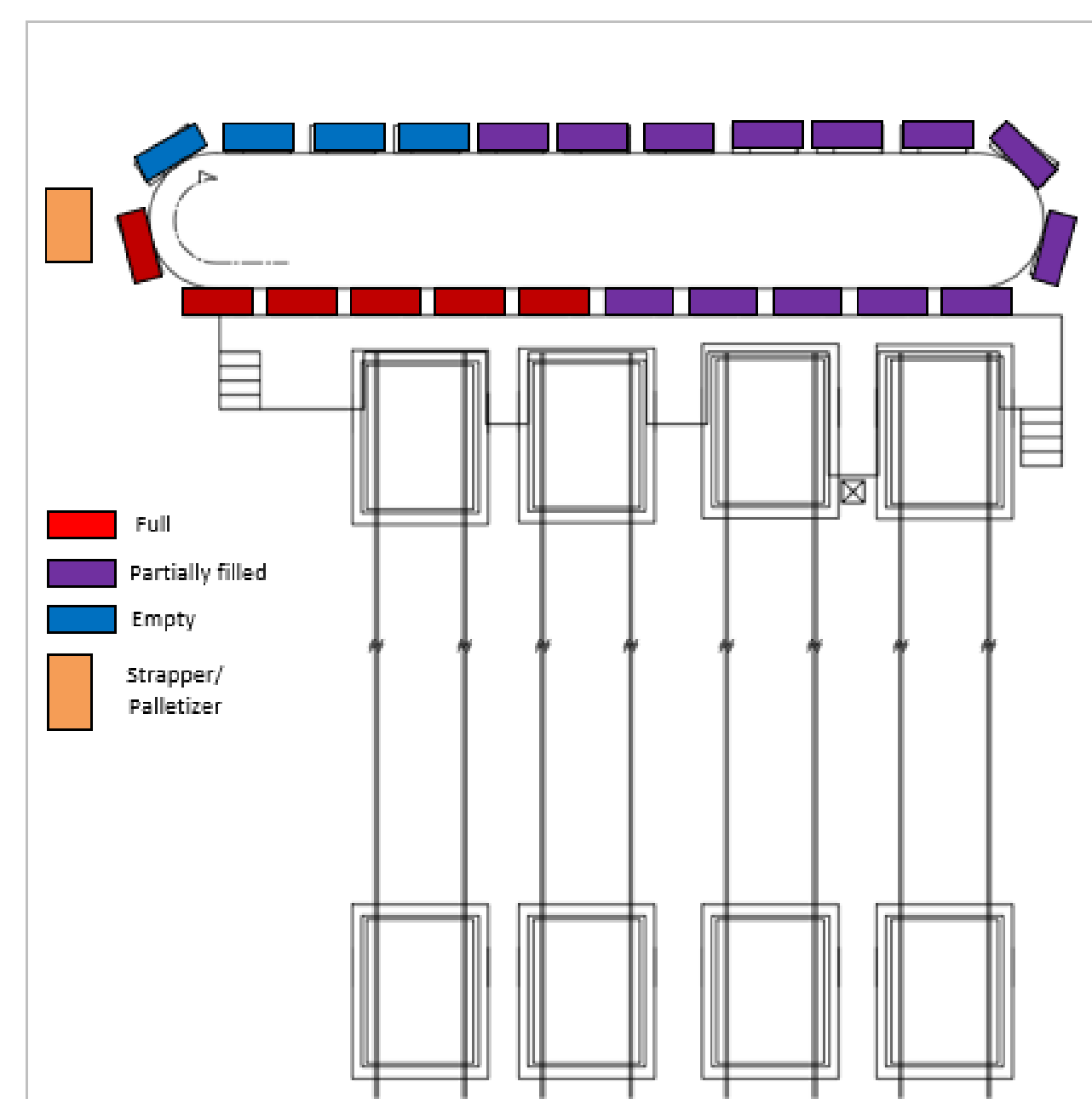
- **Disproportionate idle times** across the brick sorting lanes have amplified the physically challenging nature of the post.
- **Organizational behavior factors** prevent the implementation of complex changes to the sorting station.

OBJECTIVE

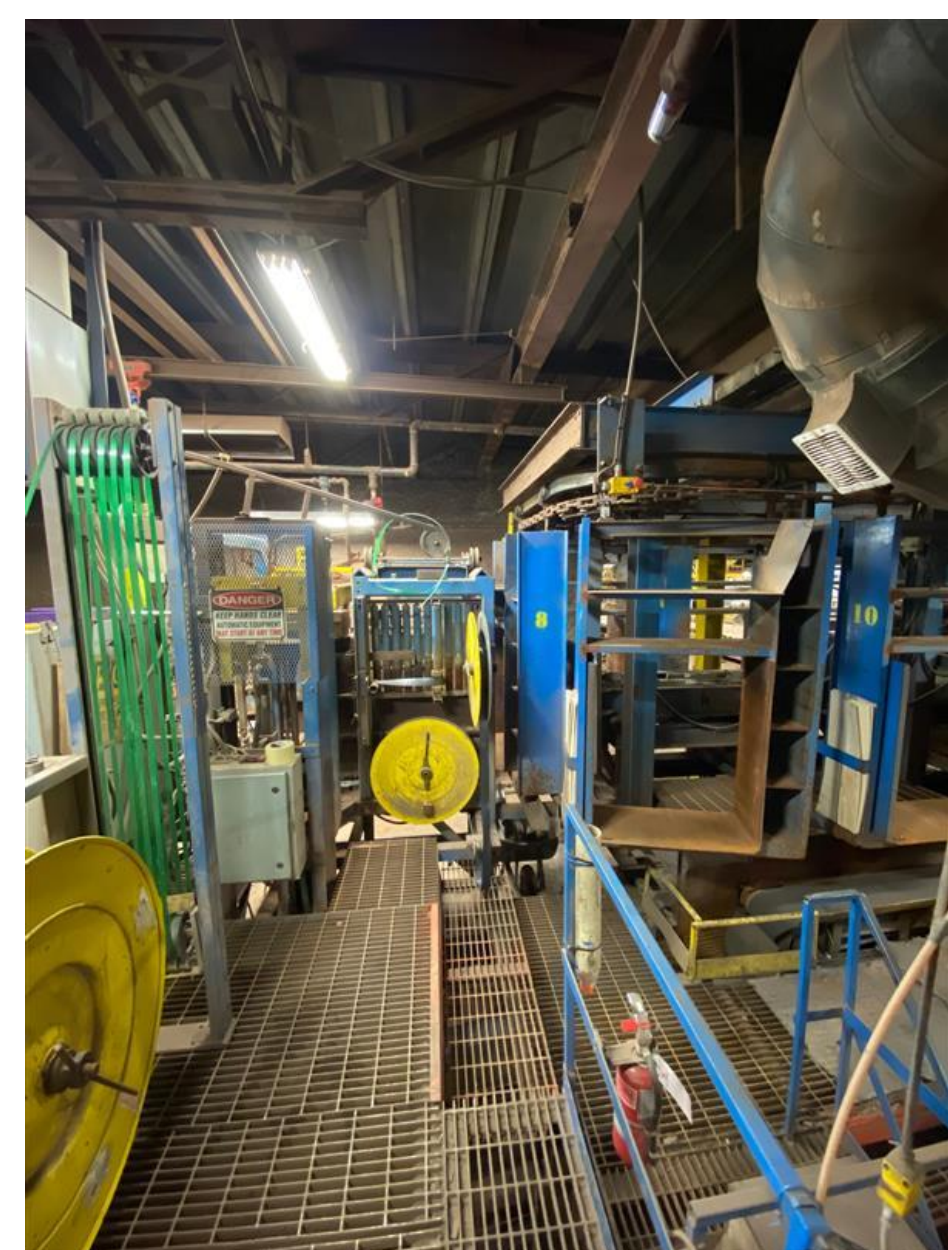
- **Balance workload** across all lanes.
- **Analyze** current manual materials handling (MMH) techniques and advise on potential solutions

CURRENT STATE

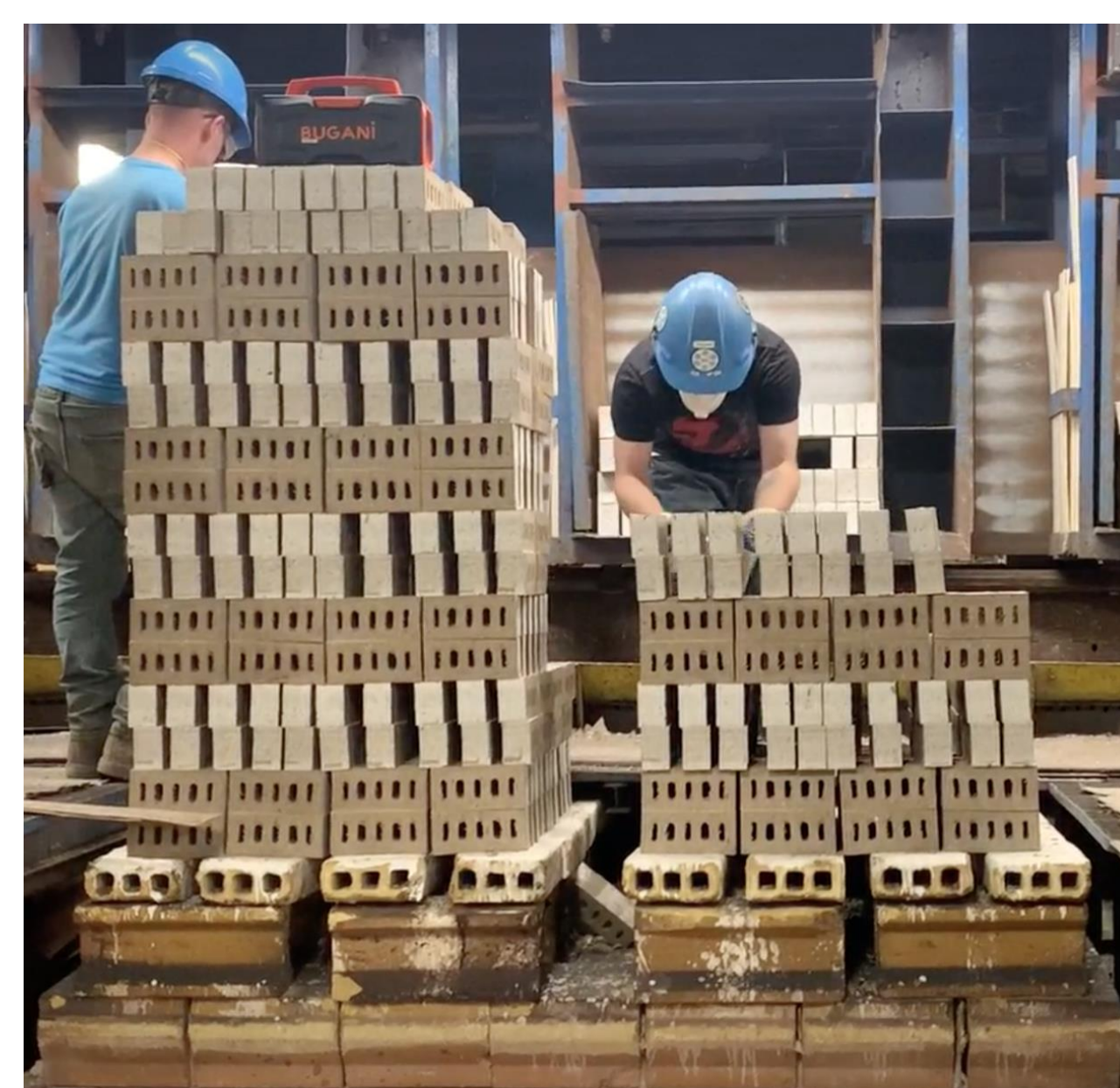
- **Underutilization** of operators at individual lanes.
- Operators tend to adopt **poor ergonomic postures**.
- Operator perceptions can create a **negative sentiment**.



Current State - Brick sorting station



Current State - Sorting station strapper



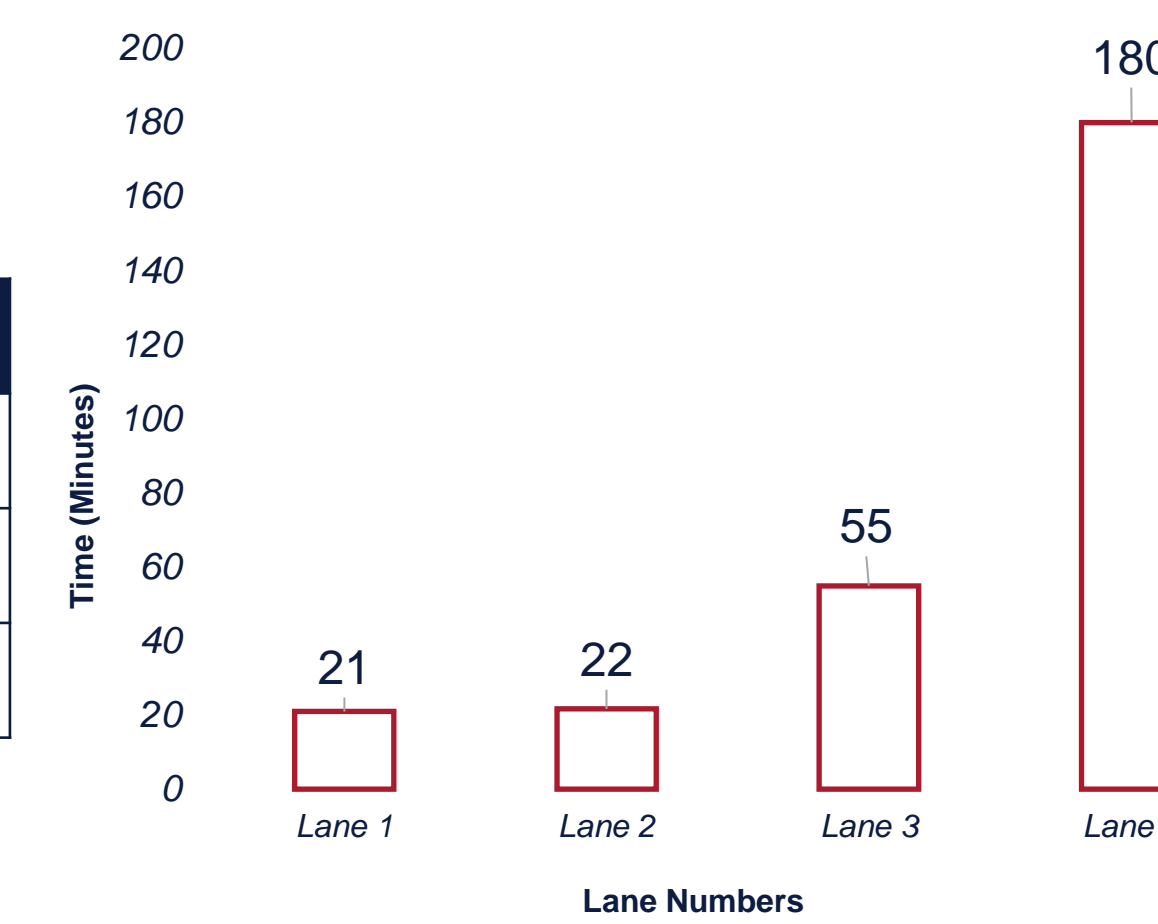
Current State - Poor Ergonomic Posture

ANALYSIS

- **Time studies** of each lane.

Lane	1	2	3	4
Idle Time (minutes)	21	22	55	180
Time active	459	458	425	300
% Active	96%	95%	89%	63%

Current State - Time study



Time study - Lane idle time per shift due to full jigs

- Conducted **surveys** and **interviews** to understand issues with the current system.
- Analyze recurring **injuries**

Percentage of Workers	Hardest Part of Job
62.50%	Bending/Stooping
18.75%	Weight of the Brick
18.75%	Twisting

Ergonomic Analysis - Types of postures observed

- Conducted **ergonomic risk assessment**

Description	Vertical Height (m)
28 in (knee height)	0.71
43.5 in (waist height)	1.10
58 in (shoulder height)	1.47
72 in (overhead)	1.83

LIFFT Analysis - Vertical height values for each subtask

- Lifting Fatigue Failure Tool (LIFFT) Analysis
- Recommended Cumulative Rest Allowance (RCRA) Analysis

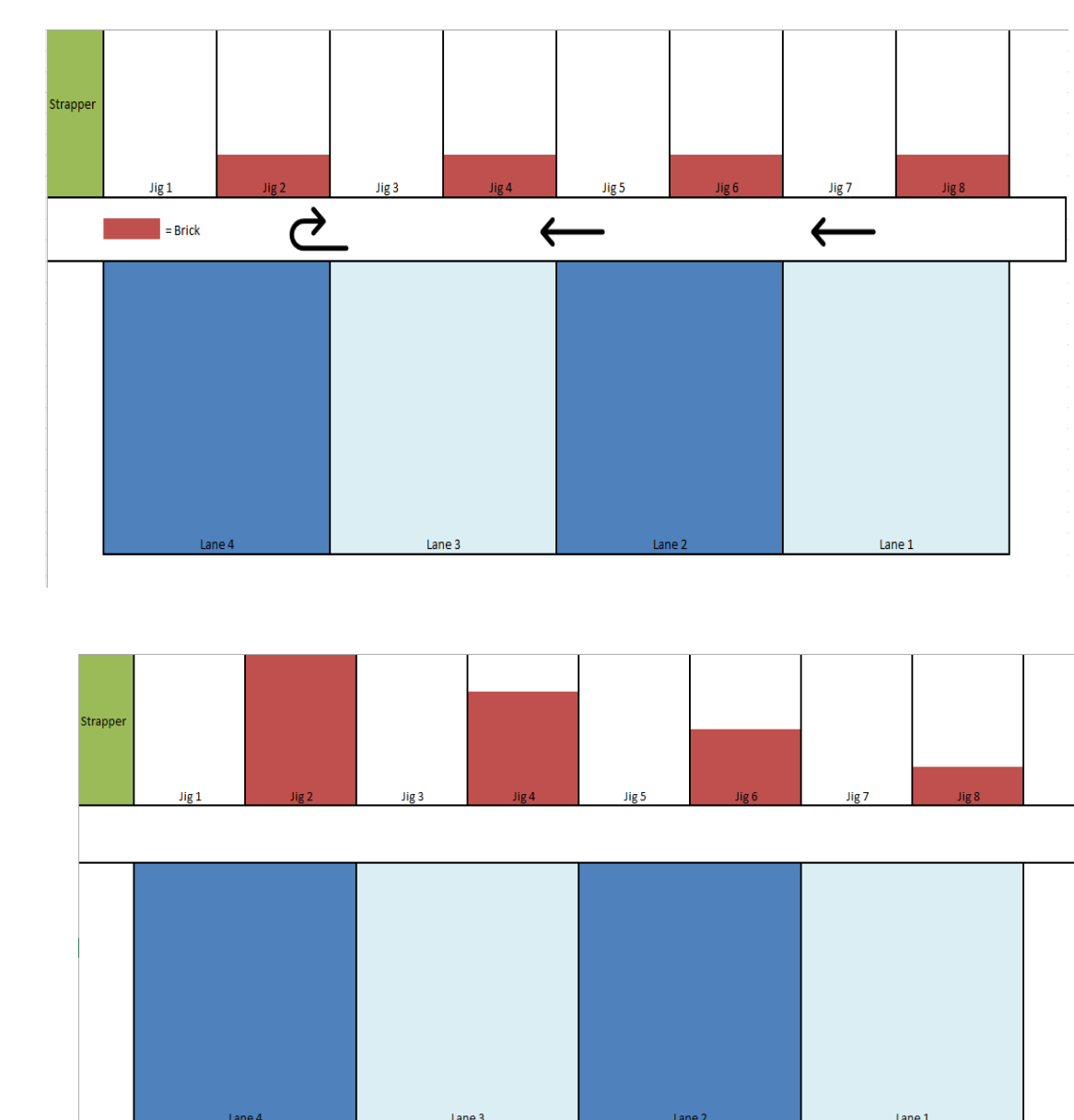
Potvin, J (2021) LIFFT and RCRA Analysis

# of Bricks per lift	Daily Cumulative Damage (%)	Associated Risk Level
2	1.3%	Low
4	4%	Low
5	4%	Low
8	5.3%	Low

LIFFT Analysis - Resulting cumulative damage values and risks

PROPOSED SOLUTION # 1

- Implements a policy in sorting that encourages a more **even distribution of empty jigs**.
- Each lane will contribute in a more balanced manner, **increasing productivity**.
- **Frequent rests** for the outer lanes.



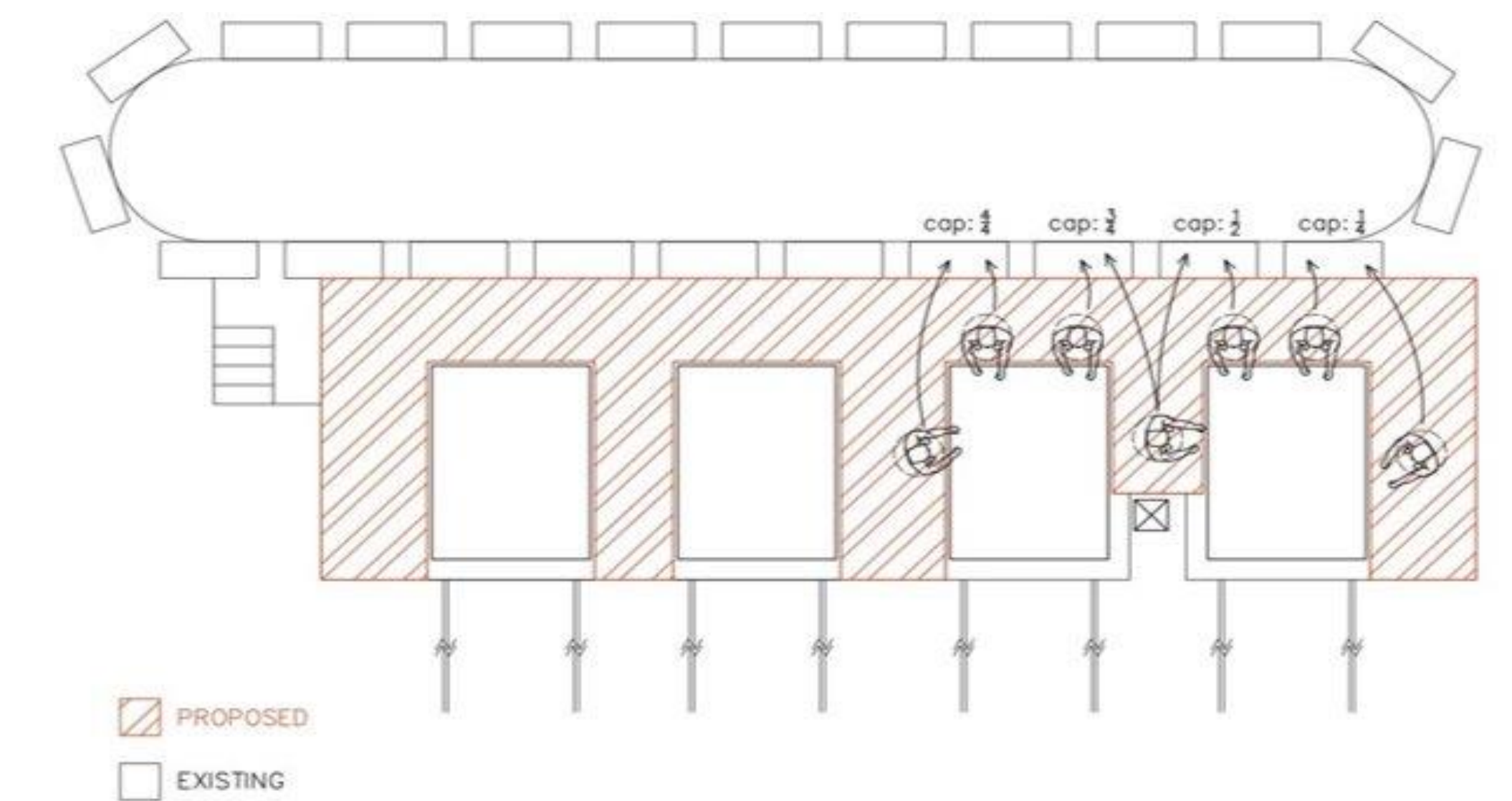
Workstation view showing only jigs immediately available to operators.

PROPOSED SOLUTION # 2

- **Expansion** of the existing sorting platform for increased access to railcar/brick.
- **Minimizes lane idle time** to give workers better access to empty jigs, allowing them to sort at their own pace.

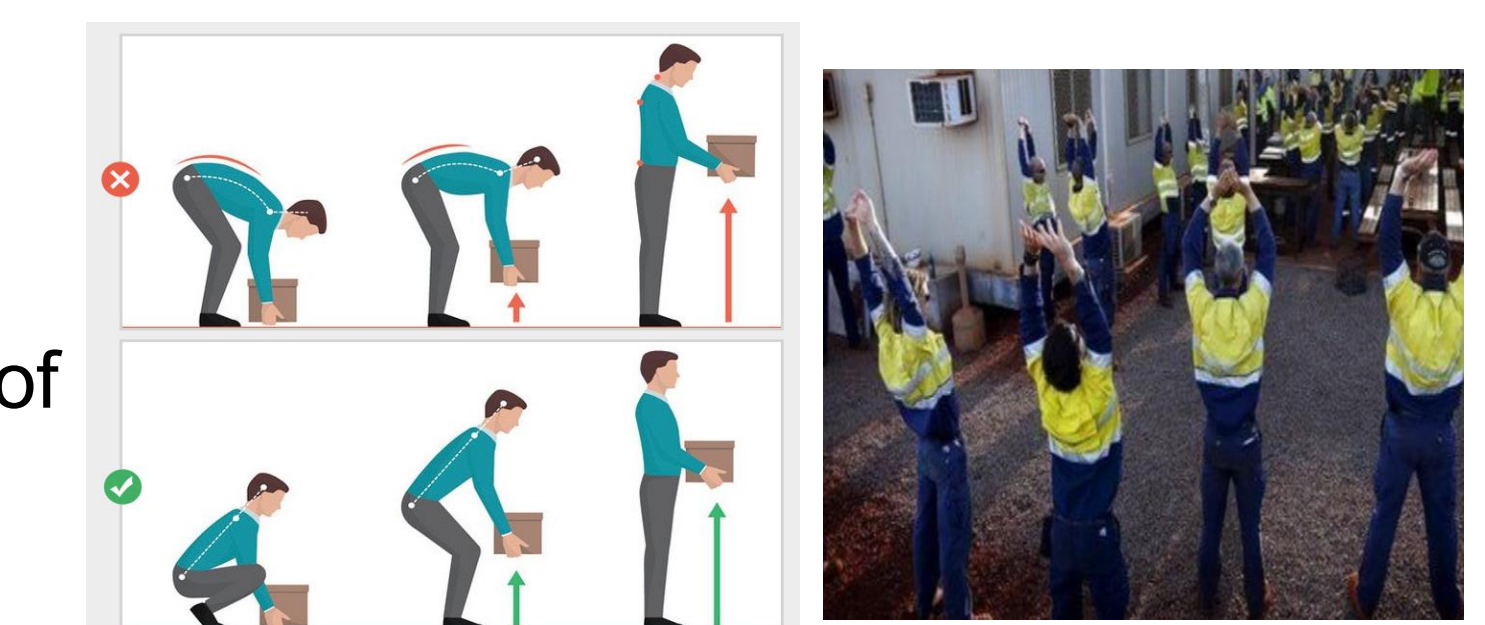
Jig Number	Capacity (# of Brick)	Completed Rows
1	52	2
2	96	4
3	148	6
4	200	8

Proposed Solution - Brick capacity comparison



FUTURE WORK AND POLICY RECOMMENDATIONS

- **Proper Training** on Safe Lifting Techniques.
- Encourage **Early Reporting** of MSD Symptoms.
- Workplace stretching programs.
- Implement a shift rotation schedule.
- Ensure periodic breaks.
- Monorail operators should have a **signal system** implemented to remove unnecessary complexity.
- Develop and foster an inclusive workplace culture.



Tamminen, Y. (2021, May 24). Ergonomics.

Stearns, M. n.d. Workplace Stretching Programs

Rotation	Hour	Lane 1	Lane 2	Lane 3	Lane 4
1	2	Worker 1	Worker 3	Worker 5	Worker 7
	4	Worker 2	Worker 4	Worker 6	Worker 8
2	6	Worker 3	Worker 5	Worker 7	Worker 1
	8	Worker 4	Worker 6	Worker 8	Worker 2
3	2	Worker 5	Worker 7	Worker 1	Worker 3
	4	Worker 6	Worker 8	Worker 2	Worker 4
4	6	Worker 7	Worker 1	Worker 3	Worker 5
	8	Worker 8	Worker 2	Worker 4	Worker 6

Shift Rotation Schedule

