



# Industrial Ergo *Engineering* *Hacks*

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# In a Perfect World...

Ergonomics

*the study of*

*human beings and a system*

*with the goal of maximizing*

*human-system productivity,  
efficiency, and safety.*



In Reality...



# Ergo program best practices

- Management is committed
- Have a clear written program
- Train at onboarding and annually
- Risk Assessment Library
- Early reporting culture
- Furniture/equipment is as adjustable as possible

# Ergonomics seeks to mitigate risk

Force  
Repetition  
Duration  
Awkward Posture

Contact Stress  
Vibration  
Extreme Temperatures  
Mental Load

# Industrial Ergonomic Hacks

All too often, re-engineering tooling and product design is not an option.

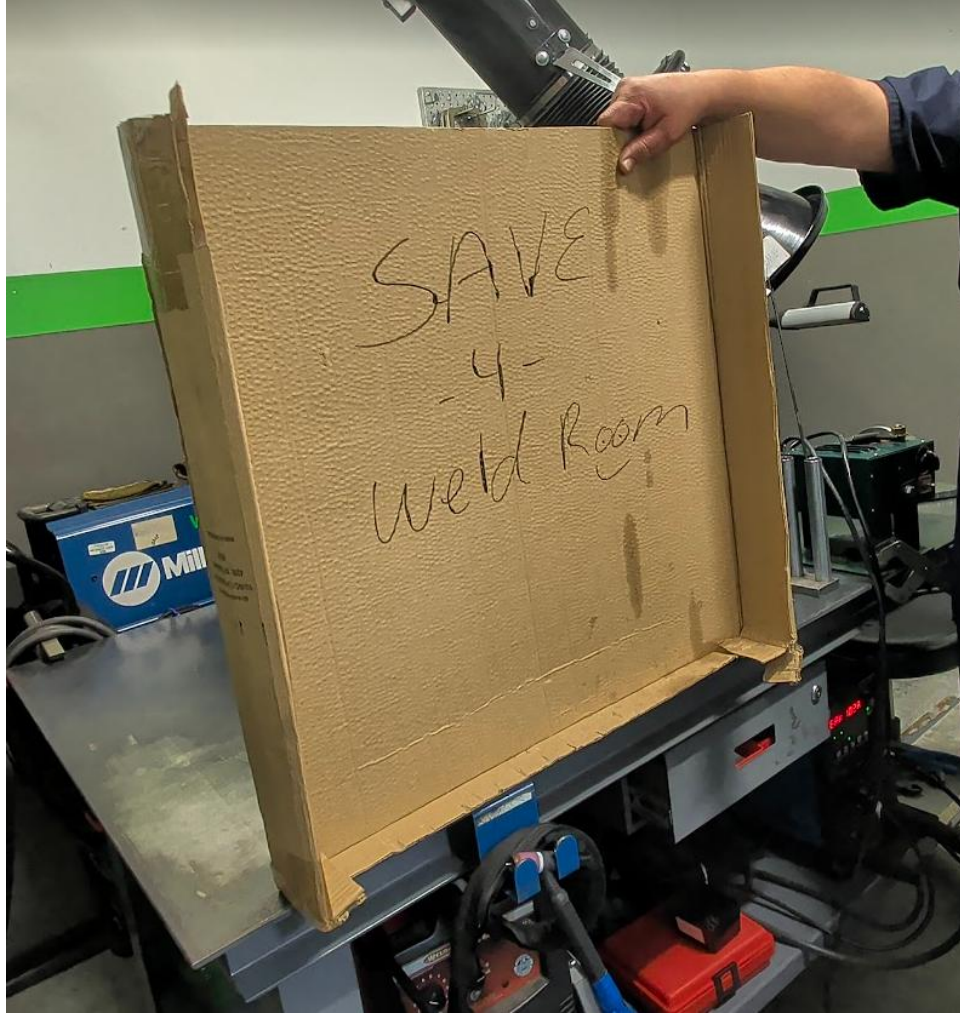
What can you do?

**Those doing  
the job have  
the best ideas!**

*“What would make this task easier for you to do?”*

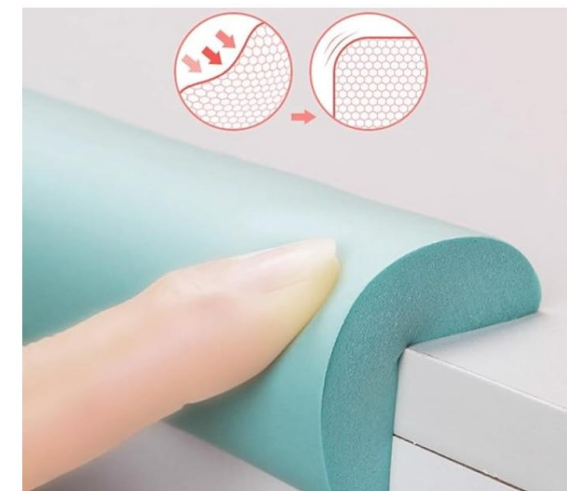
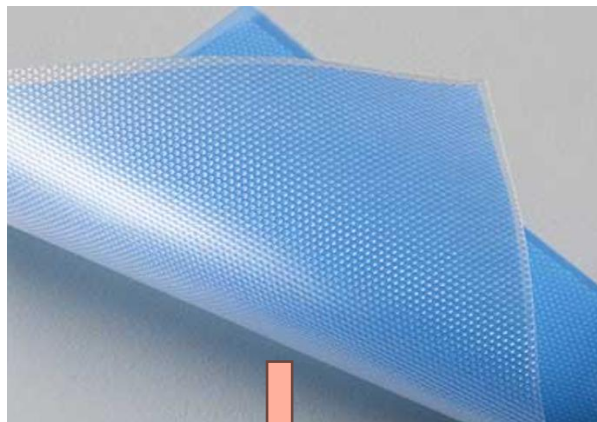
*“What is the hardest or most annoying part of this task?”*

*“What are the jobs the team dread or complain about doing?”*



# I. Existing, Inexpensive, and Administrative

Add foam to  
handles and edges



More flexible hoses,  
more length on  
cords



# Swivel Attachments

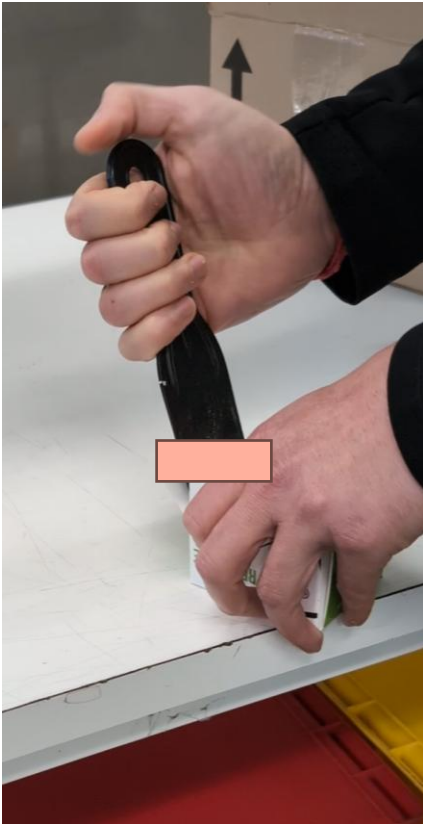


# Creating a platform

Raise task to increase visual access, tilt when it reduces wrist angles or improves visual access



Is it the right tool  
for the task?



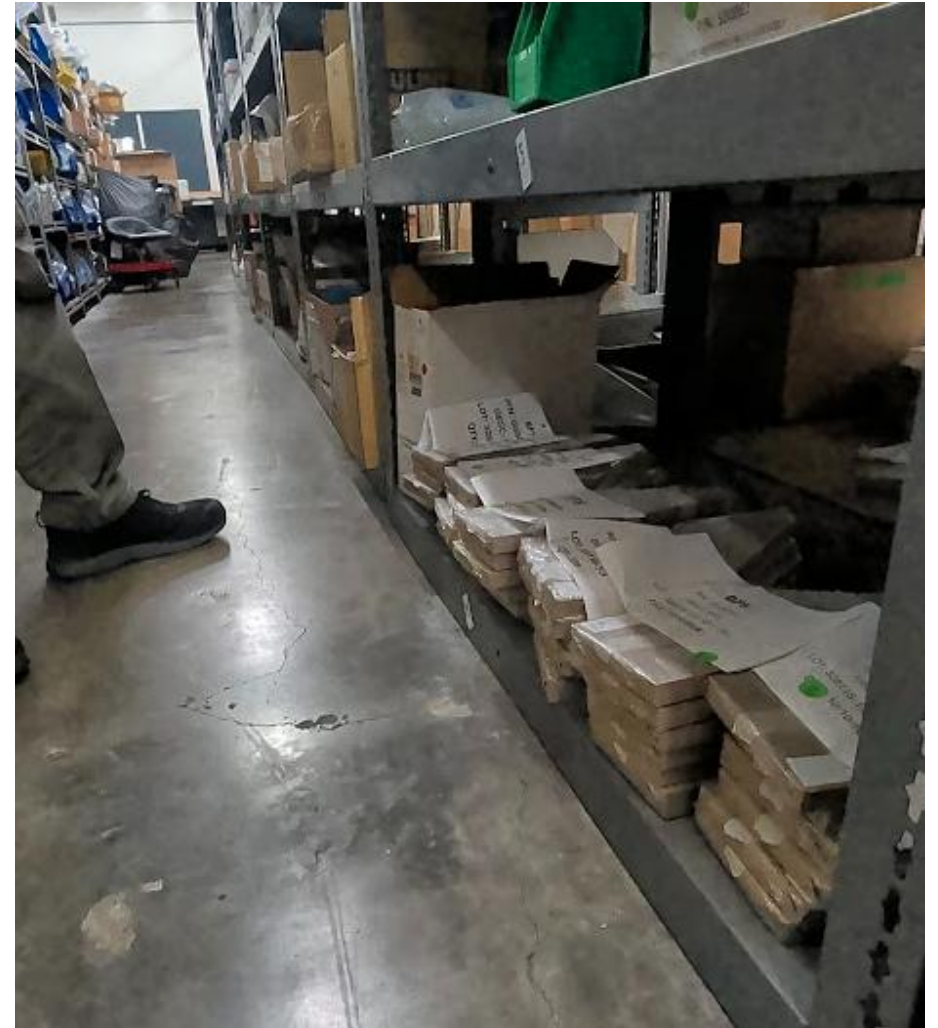


Right gloves for the task?

Use bins with  
handles when  
possible



Re-organize so  
heavy items are in  
middle shelves



# Re-arrange workstations

Look for spacing, height differentials



Re-arrange items to work in power zones

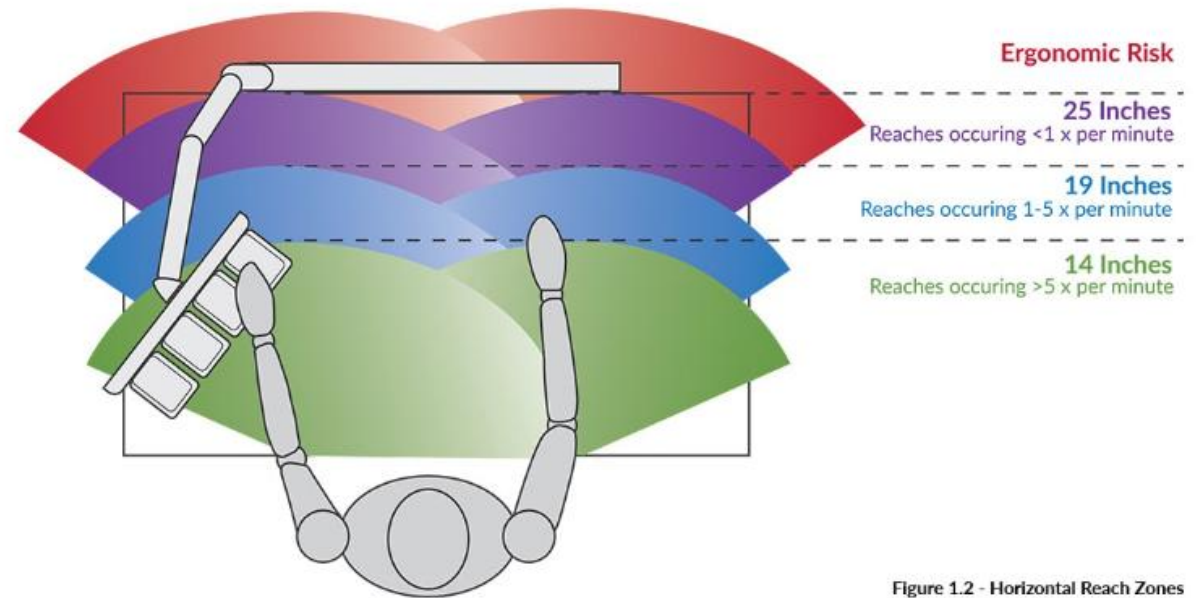


Figure 1.2 - Horizontal Reach Zones

# Look for “bulking” Opportunities



## II. 3D Printing

# Sharp Edge Buffers



Printing or  
Developing:

Handles and Knobs

Platforms



# Board Puller, PCB Extractor tool



<https://www.onlinecomponents.com/en/productdetail/essentra/ccp101-49618948.html>

# IV. Simple Engineering Changes



Tilted  
surfaces

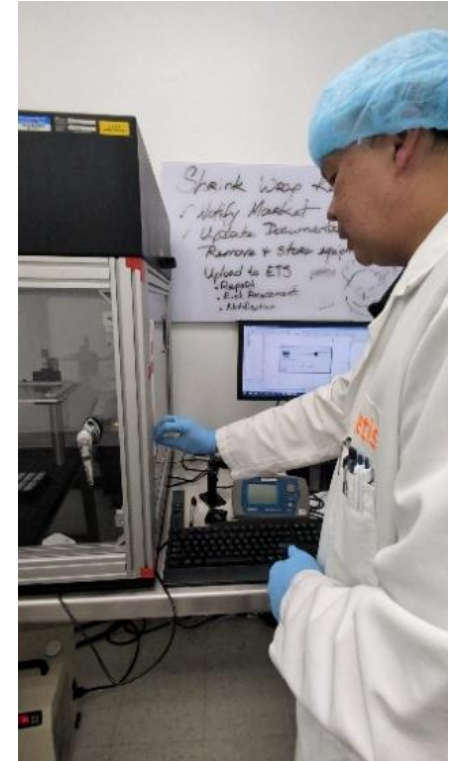
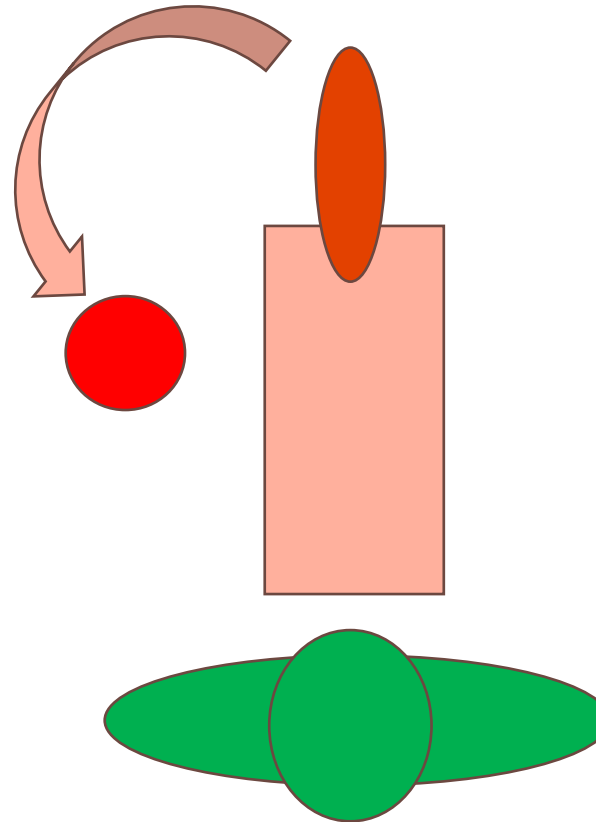


# HANDLES! And Buttons

Location

Orientation

Length (very low or high locations!)



# Create nests/fixtures



Custom engineering fixture supports product during assembly

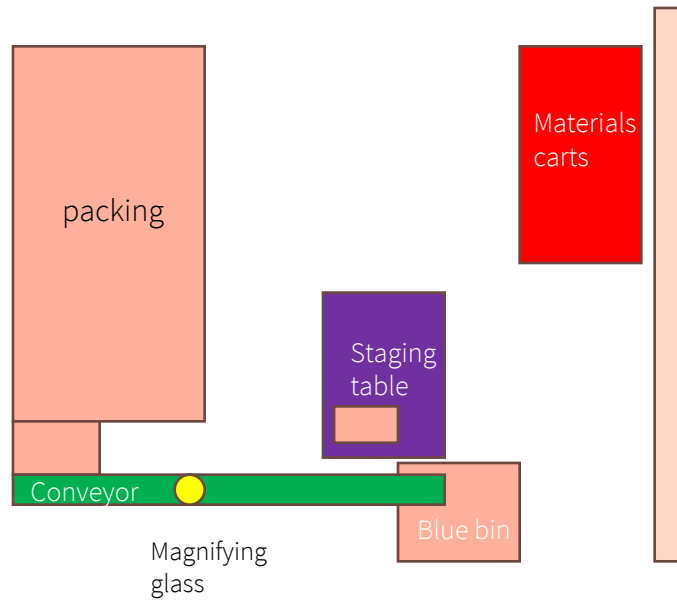
# V. Cognitive Ergonomics

# Look for space restrictions

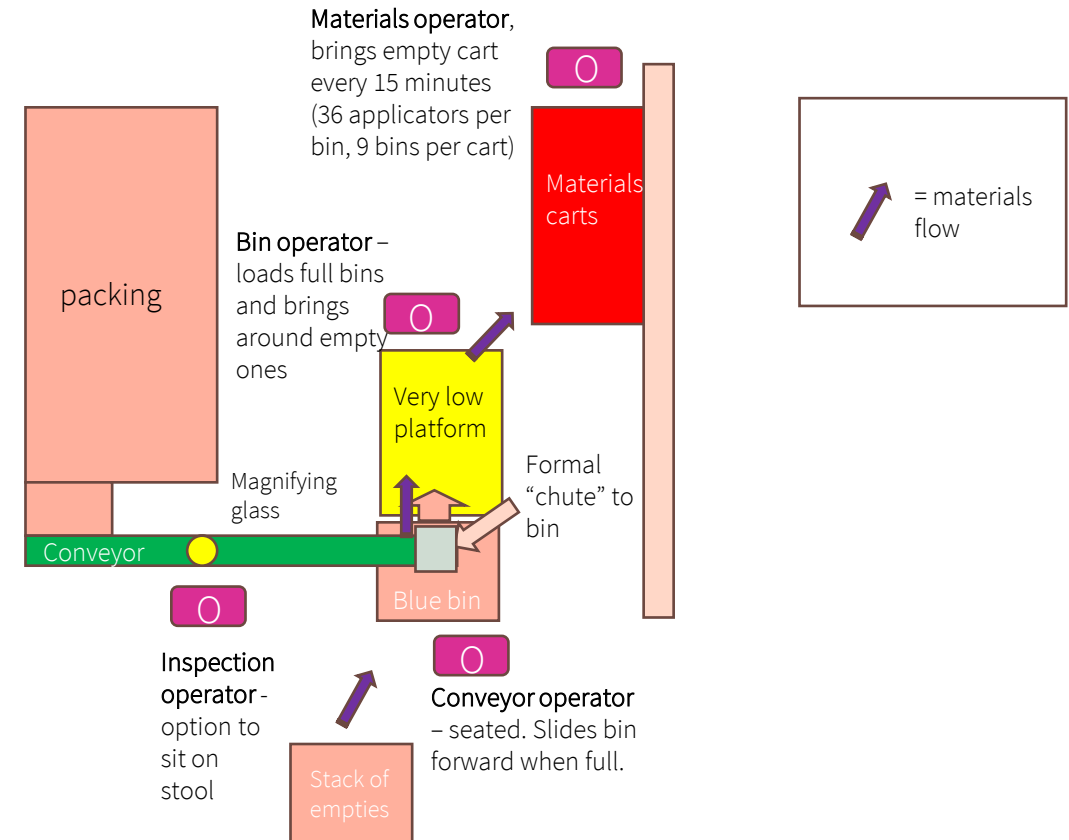
- move surfaces
- add surfaces
- re-organize



## Current Workspace Configuration



## Proposed Process Flow #1



Full bins slide forward onto very low platform (or floor), and are loaded onto the materials cart. Drop applicator max to 36 per bin. This will require new cart every nearly every 15 minutes. Each position rotates every 20 minutes.

# Increase tool availability

1. Enough trays/fixtures  
(slow work down if not)
2. Enough tweezers!

# Labeling – Increase visual access



1. Washer label

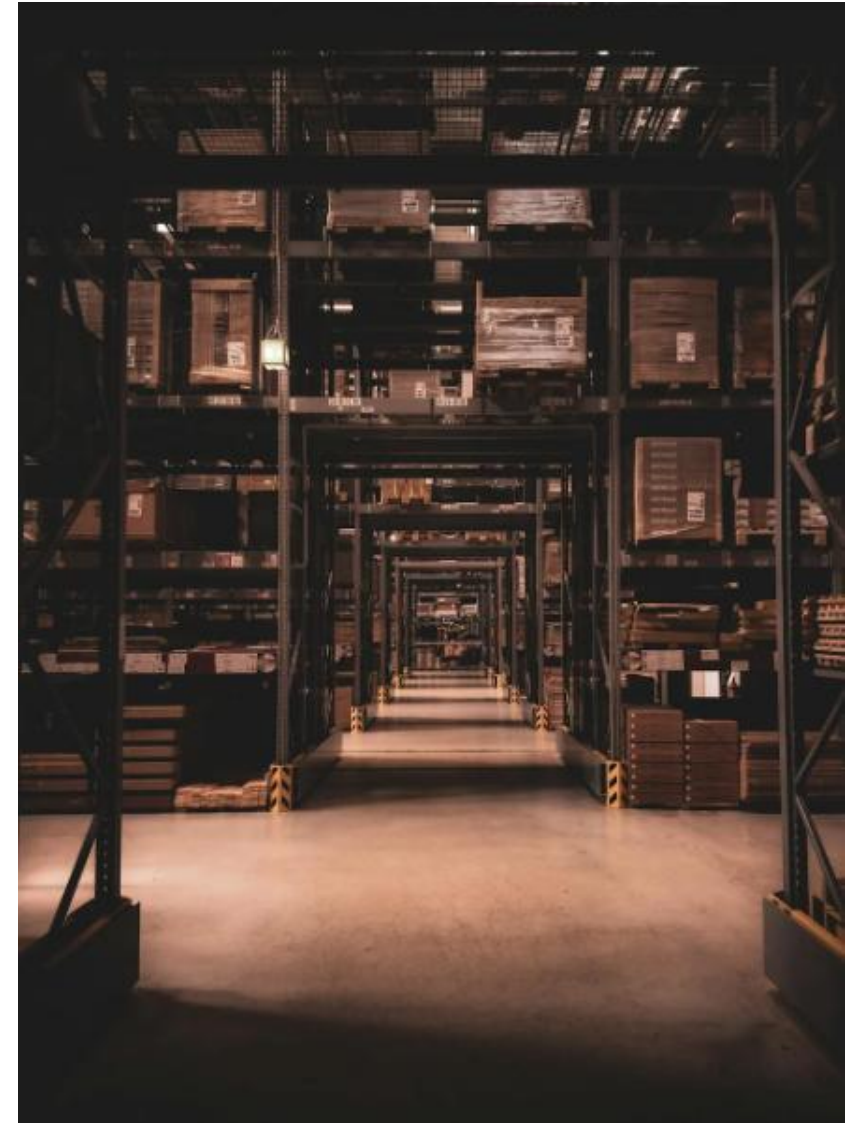


2. Shipping/Receiving – printing all labels larger

3. Providing guidelines/grids (reduce need for visual acuity and thinking time)

# Lighting

1. See labels (reduce need to print larger)
2. Fine motor tasks (reduce neck craning)



# IV. Procuring New Equipment

# Vacuum pens



# Pry and Push tools



# Reverse action tweezers

Your hand is relaxed while the object is pinched



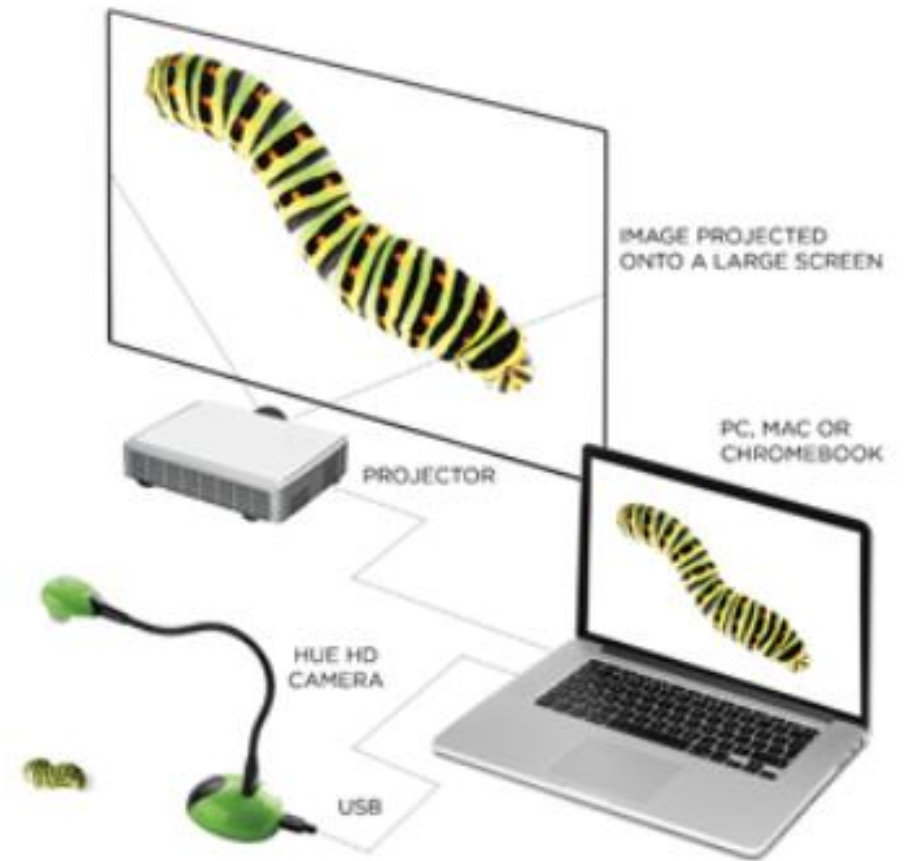
Tweezers/forceps with  
“improved” grip



<https://www.fishersci.com/shop/products/ergonomic-style-forceps-3mm/50550316>

# Large monitors & Projecting tools

Use of mirrors or cameras to project images to fix poor viewing angles. Use of laptops across the line/lab is big mistake



# Adjusting pallet tables



# Change out wheels



# Multi-channel electronic pipettes



# Scissor Carts



Small, mobile  
height adjustable  
tables



# Microscope Platforms & Specimen Platforms



<https://optimetrics.com/product/optimetrics-at-20-single-instrument-electric-table/>



<https://www.amazon.com/Mavaol-Adjustable-Adjustment-Construction-Equipment/dp/B0F1F1NC8P>



# Tilting equipment



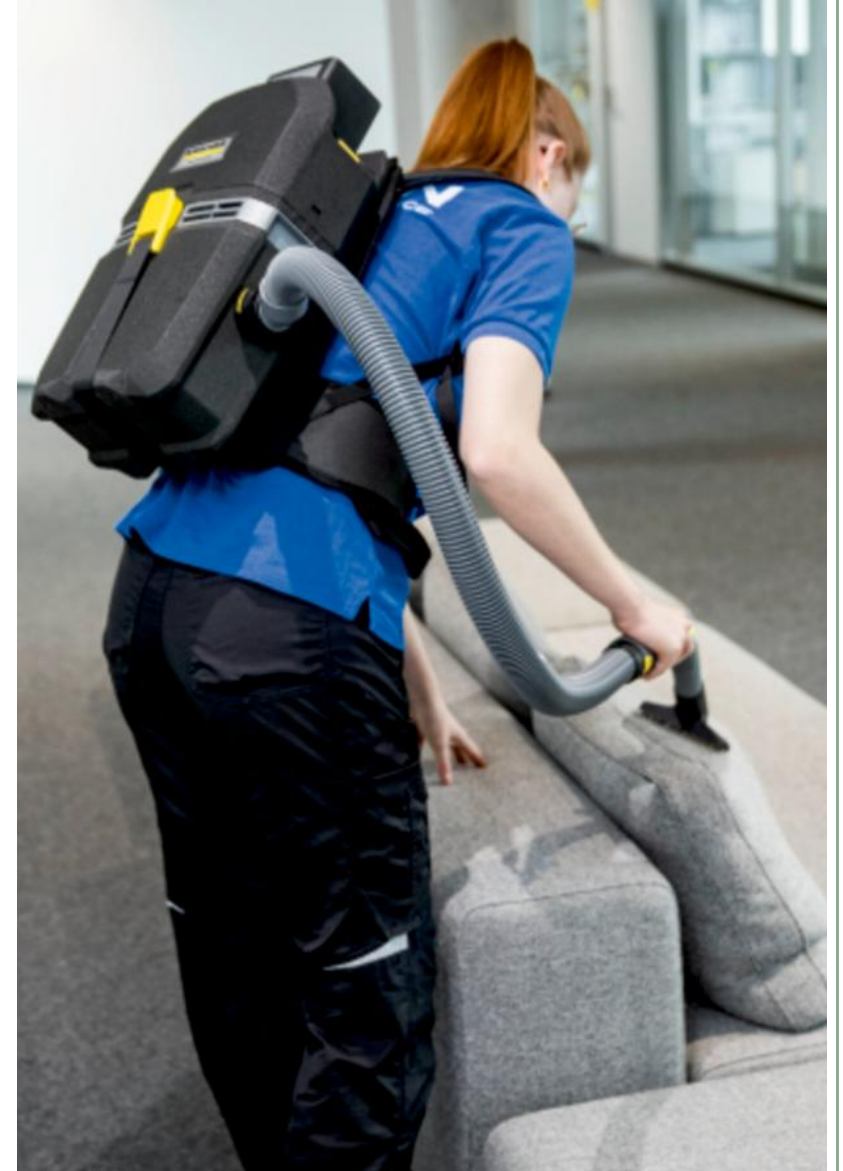
<https://www.thefabricator.com/thefabricator/article/materialhandling/the-economics-of-ergonomic-material-handling>

# Arm support



<https://www.fishersci.com/shop/products/herasafe-2030i-1-2m-basic-nsf-1/09034253>

Lightest weight  
tools (mops,  
vacuums)



# Chairs with chest support



# Stools that get associate closer to task



# Footrests



Separate Monitor  
and Keyboards  
whenever possible!



# Height adjustable benches



Thank you

# References

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