

What's New in Ergonomic Assist Devices

Sponsored by: E.A.S.E. Council

Speaker: James J. Galante Southworth Products



- Non Profit Trade Association
- Established 1945
- Members include 650+ Manufacturers

E . A . S . E .

**Ergonomic Assist
Systems and Equipment**

A Product Council of Material Handling Industry of America

PROBLEMS

Manual Material Handling

problems?

Problems

Problems!

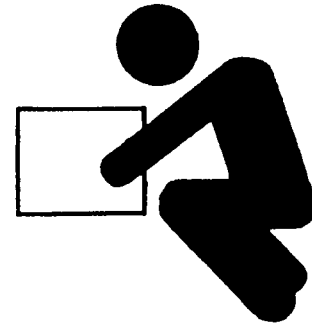
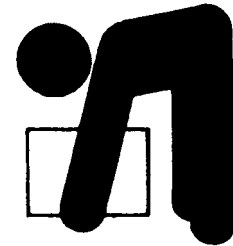
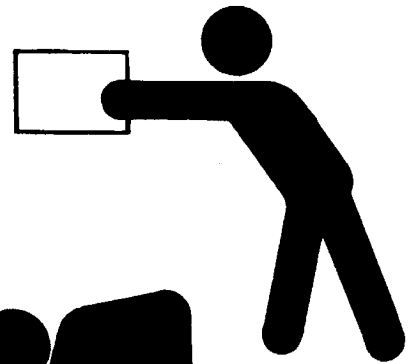
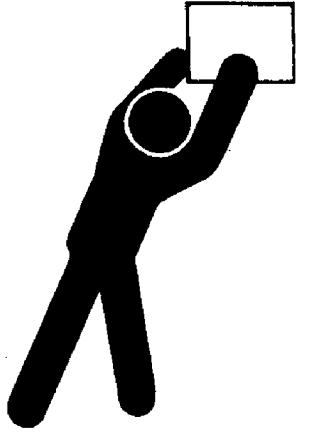
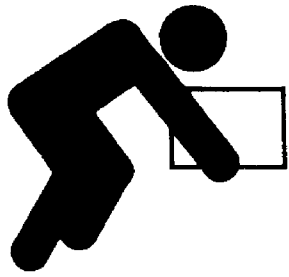
OR

P-r-o-b-l-e-m-s

PROBLEMS

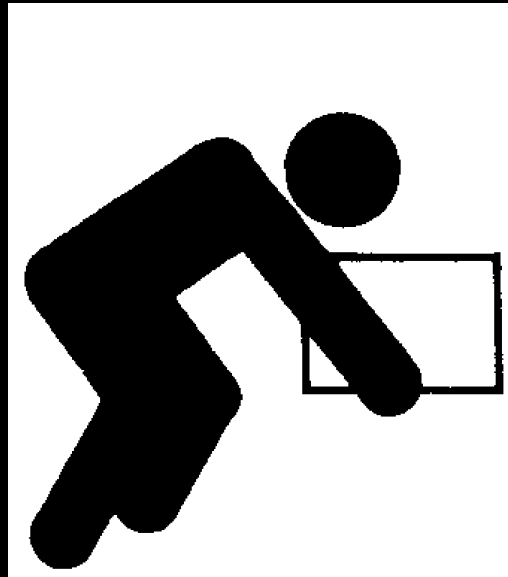
Material Handling opportunities
through applied ergonomics?

LIFTING
STRETCHING
REACHING
BENDING
STOOPING
and
WALKING



These unnecessary worker activities can result in low productivity, worker fatigue, and costly job-related injuries.

LIFTING

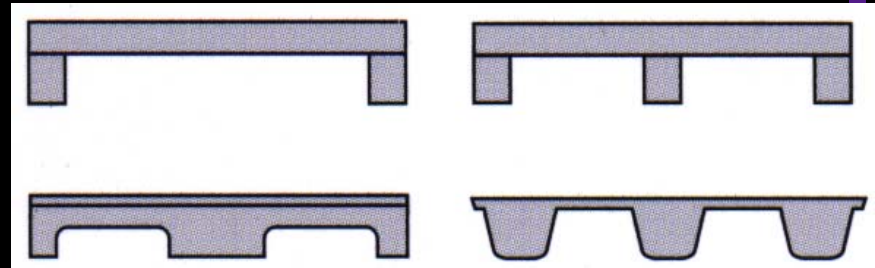


- Reaching and lifting to load/unload pallets
- **Awkward back extension to access the far side**
- Difficult and improper grip to the load or parts
- **Bending over and twisting associated to the manual tasks**

Pallets



**MANUAL LOADING AND UNLOADING
OF PALLETS CONTINUES TO BE
ONE OF THE MOST COMMON AND
MOST INJURY PRONE TASKS
IN INDUSTRY TODAY**



*OOH... I HATE
MY JOB!*

*...DON'T LIKE MY
BOSS MUCH
EITHER!*

WASTED TIME

WASTED ENERGY

LIKELY INJURY



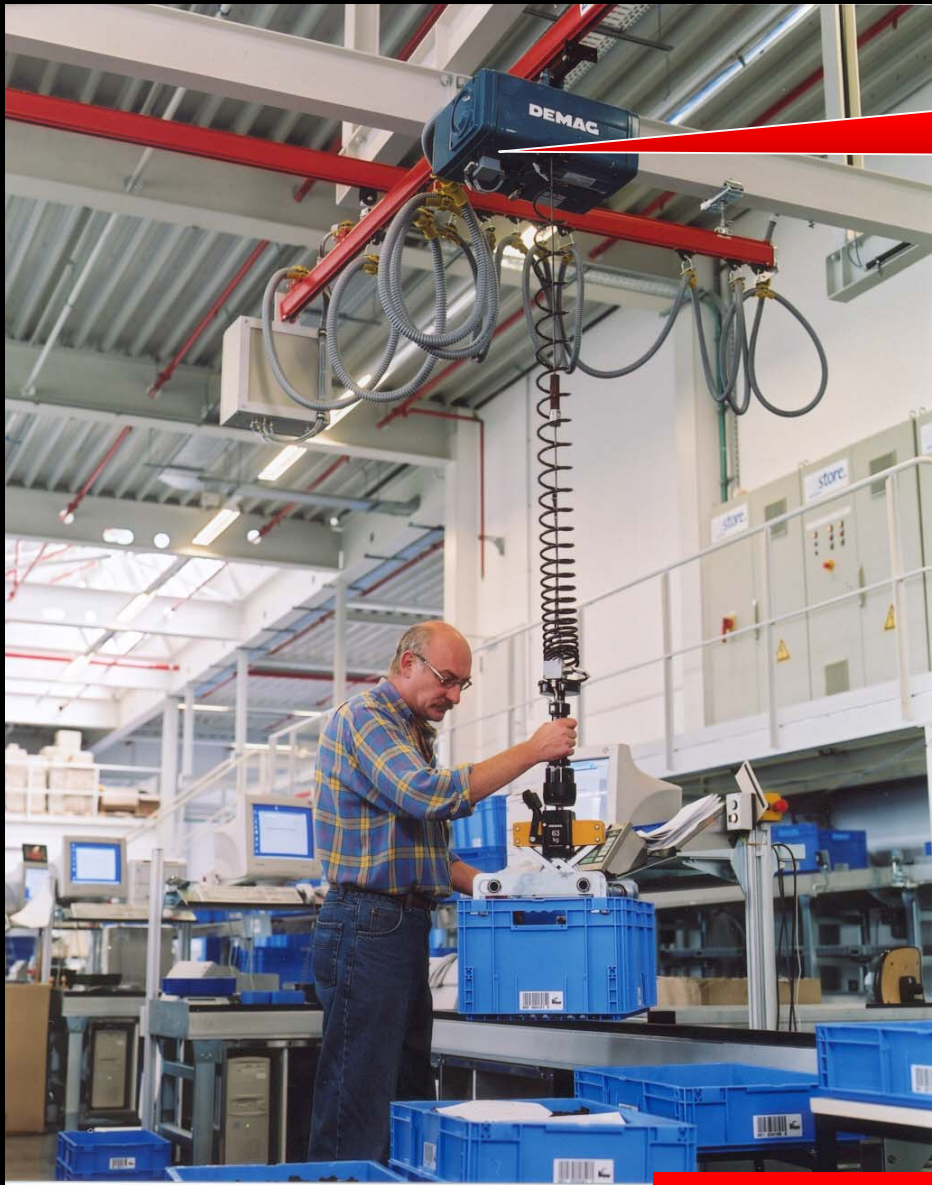


These are automatic load leveling devices that maintain the top of the load in the 30 to 38" ergonomic window



This lift is portable

Sitting or standing a lift can eliminate the back bending to associated with pallet loading/unloading



Notice the bi-directional work station crane

Balancers can also be used to unload pallets and make positioning goods at various locations within a machine or work center

these trays of parts become virtually "weightless"

Lifts and positioners can also be fitted with turntables for "near side" loading



As much as 40% of the time required loading a pallet, can be spent walking around it!



Gosh.. I love my job!

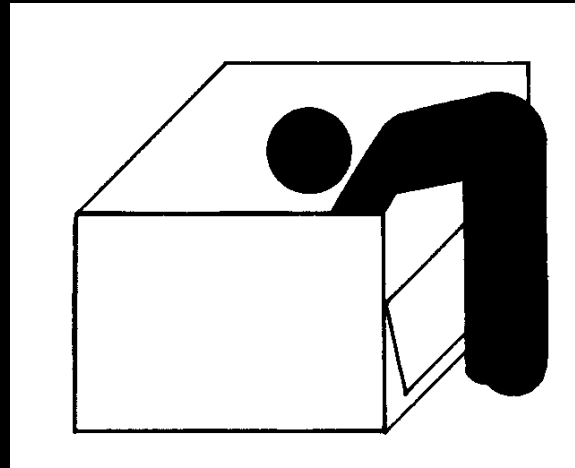
*MY BOSS IS
A GREAT GUY!*

TIME SAVINGS = 40%

WORK REDUCTION = 75%

**SUBSTANTIAL REDUCTION
IN LOST TIME INJURIES!**

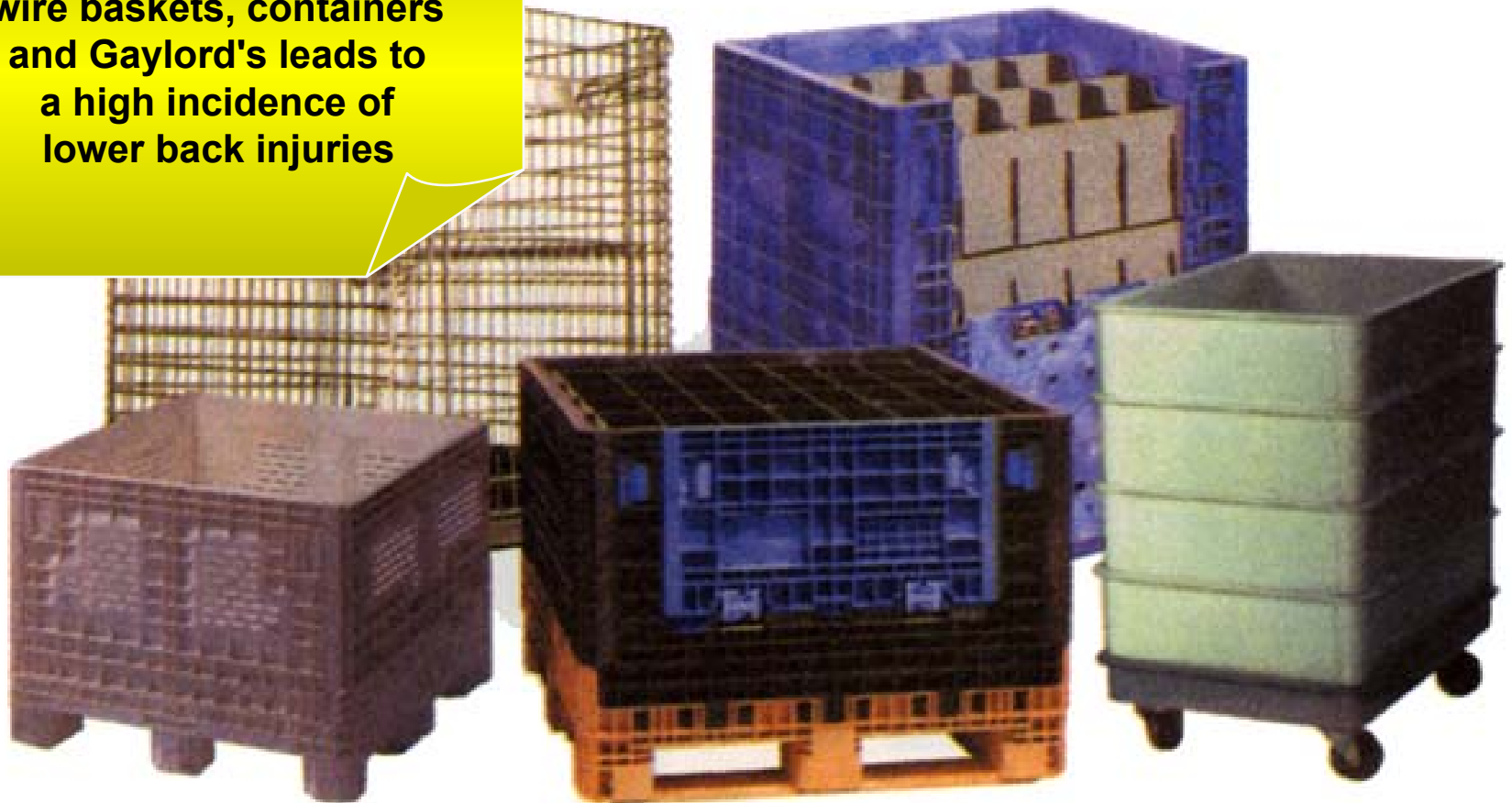
BENDING



- **Access to bottom of container is poor**
- Reach over limits bending of the legs which exaggerates back strains
- **Reaching to the far back and bottom causes back extension**

Containers

Manual loading and unloading of wire baskets, containers and Gaylord's leads to a high incidence of lower back injuries





Repetitive bending into
containers can result in
a high incidence of
back injuries



Parts picking at a hydraulic press workstation



Imagine the back extension, bending and reaching required to get to these parts



This is a
“Lift and Tilt”
giving the operator
direct control of
vertical and angular
positions

This is a completely
pneumatic machine

Work station
lifts to
eliminate
back bending
& stretching



These lifts tilt as
they rise vertically

Parts picking made productive from fixed height tilters



Notice the high hinge causing the container to elevate as it tilts

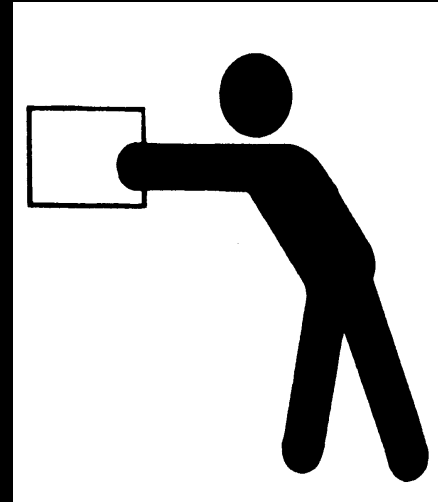
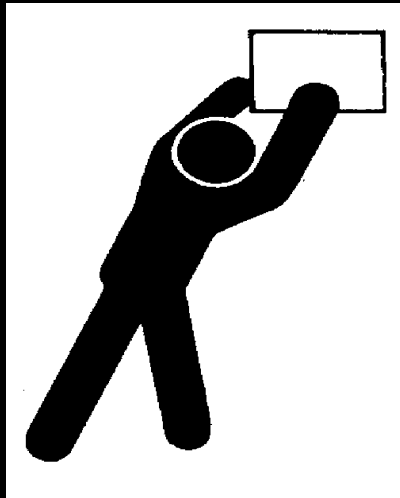


These container tilters are portable

There is a scissors lift to position the assembly

Parts Picking in Work Cells

STRETCHING AND REACHING



WHAT TO LOOK FOR ...

- Workers needing to squat, reach, and stretch to gain access to work.
- Large work pieces that require operation on more than one surface.
- Any repetitious assembly tasks.
- Work stations with stepstools or extension arms for tools.
- Equipment with access/adjustment near floor.
- Heavy work pieces that must be moved or positioned.
- Production machines that require high volume input or output.
- Work stations modified by employee to make work easier.
- Material that shouldn't be touched by hand (hot, cold, food, etc.)

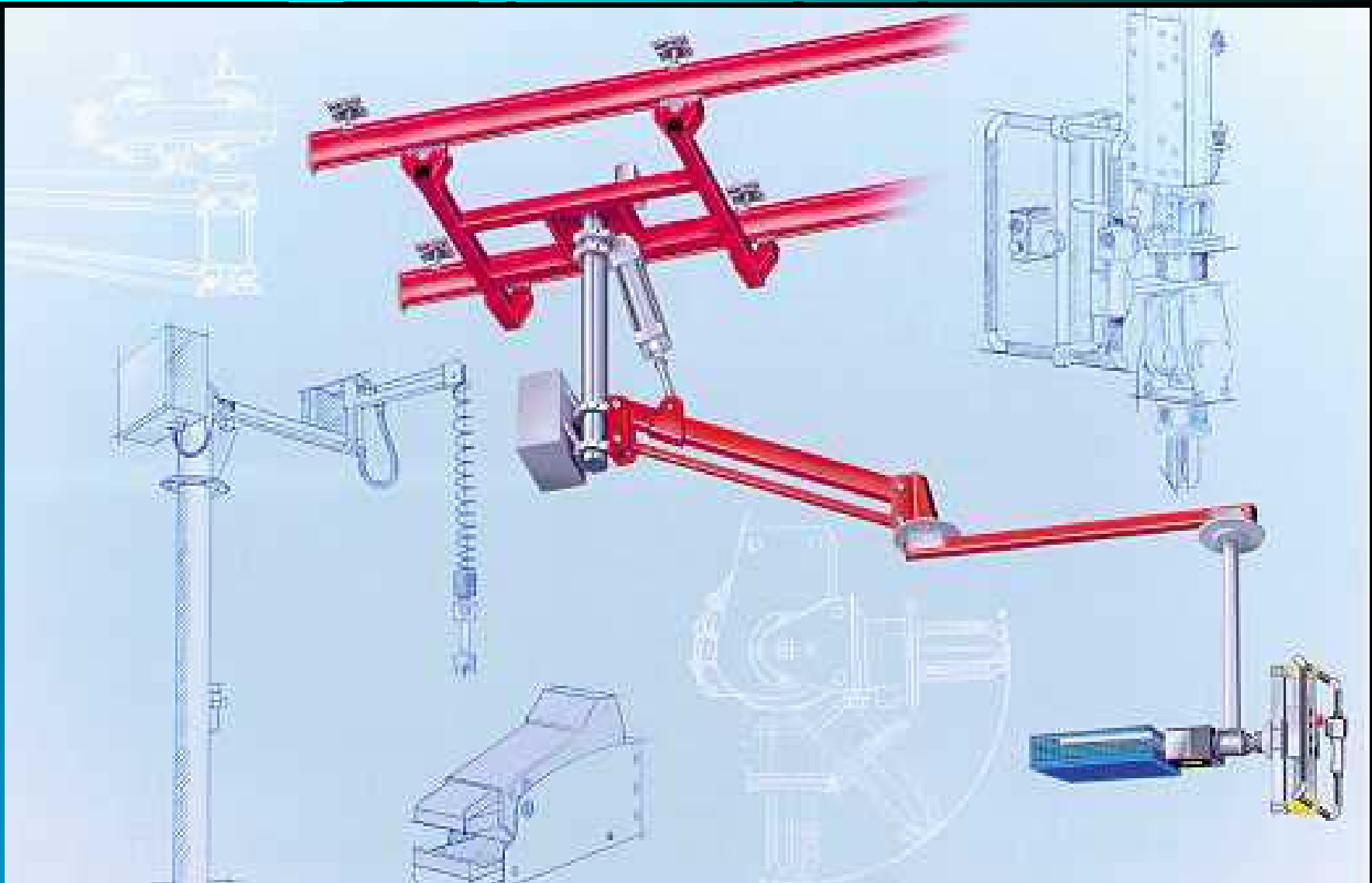
This vacuum lifter makes easy lifting and maneuvering of these heavy cheese wheels

This is a really cheesy job!



Manipulators making easy work of handling cylinder heads in a machining center





Manipulators can be suspended from a simple boom or from articulated arms to give the operator a full range of motion

Electric
chain
hoist on
articulated
jib crane



Notice the use of gravity roller
conveyor to ease the feeding of parts



Note this is a free standing structure

Work station crane to feed heavy components within a machining center

This expandable conveyor is driven right into the truck

The individual boxes and cartons are conveyed right to the worker

Notice how the odd sizes and shapes are handled easily by a single piece of equipment



Lift with 90 Degree Upender for Assembly of large panels



Portable lift for vertical positioning panels in a finishing operation



Lift & Tilt to position electrical panels in this work cell



Notice the accordion skirting to cover scissors legs

Manipulators to handle things too hot to handle ...



...or lifters
to
manipulate
the
small stuff



IAD - Intelligent Assist Devices

Amplifies operator's power

Unit has an intuitive, human-like feel

Intuitive

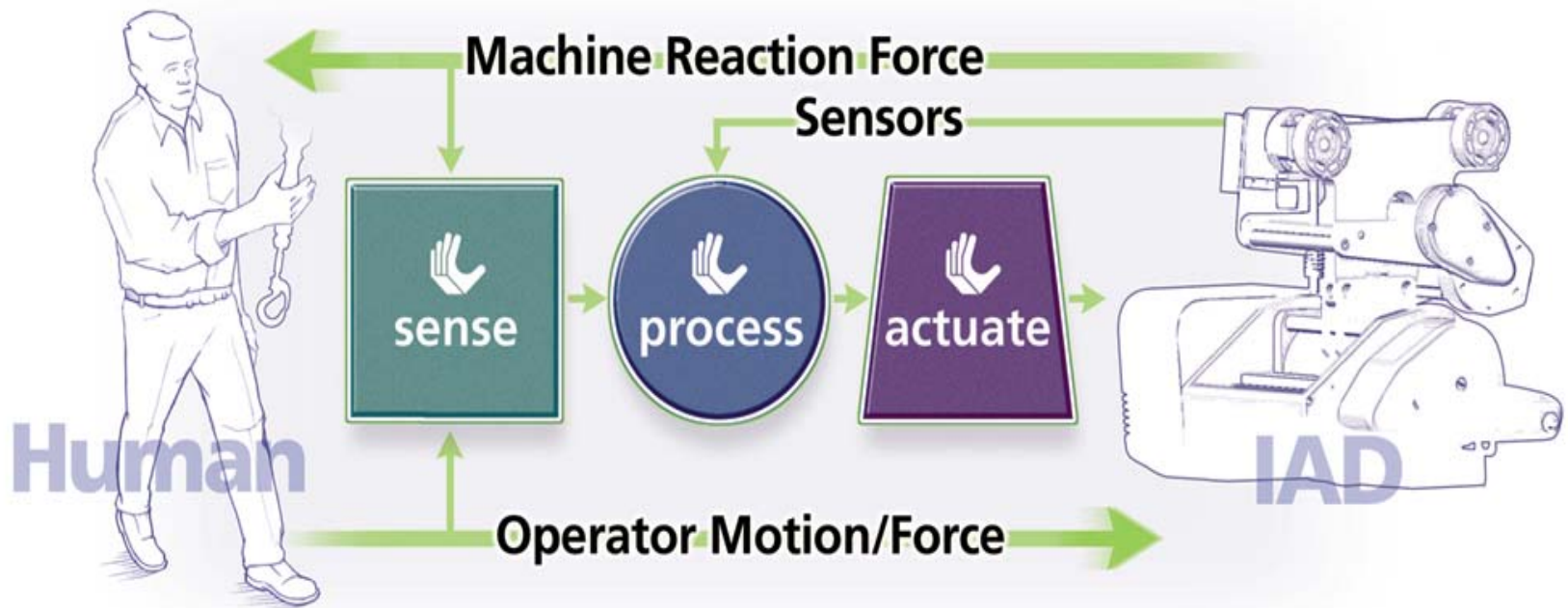
The operator has a sense of control & feel over the load using normal arm, wrist and hand movements.

Intelligent

Resolver feedback from the servomotor allows for future implementation of programmable human limits.



IAD Principles of Operation





From raising people, to put them where the work is, to...

... putting the work in a proper position in front of people, so they can work more efficiently, like this portable positioner or ...



...or this
adjustable
height
assembly
bench

Notice the back
stand shelving
and light bar



This is a portable stacker
which works well in many
work station applications

They can be equipped with
platforms or forks to
handle a variety of loads,
containers or pallets

This unit can transport
the load to and
from the work cell



Parts picking on assembly line





This lift and gravity conveyor permits one person to do what was a two man job

This portable die cart is inexpensive, fast and effective



Notice the docking clips where the cart and the rack interface

...so from
pulling parts
where
lifts need
to have
wheels, to ...





...to
positioning
really **big**
material

...that has its
own wheels...



...to the **REALLY BIG**
machines that
need to have
their wheels installed



E.A.S.E.

Proudly

presents

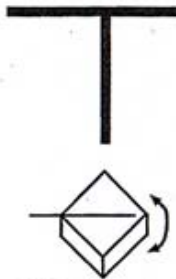
Tools and Resources



Ergonomic Motion Classifications

NAH!

Just kidding!



Rotate About
Horizontal Axis

- Pallet Inverter
- Manipulator
- End Effector



Transfer
Supported Below
Adjustable Platform
with Traverse

The image features a central wooden door set against a brick wall. Above the door is a green hanging lamp. The door has a sign that reads "PLEASE KNOCK TO ENTER" and a circular handle. Below the handle, the text "ERGONOMICS TOOLBOX™" is displayed and circled in blue. The entire scene is surrounded by several starburst graphics in shades of orange and red. The image is framed by a blue border.

**A Multi-Media Tool
for Material Handling
Problems**

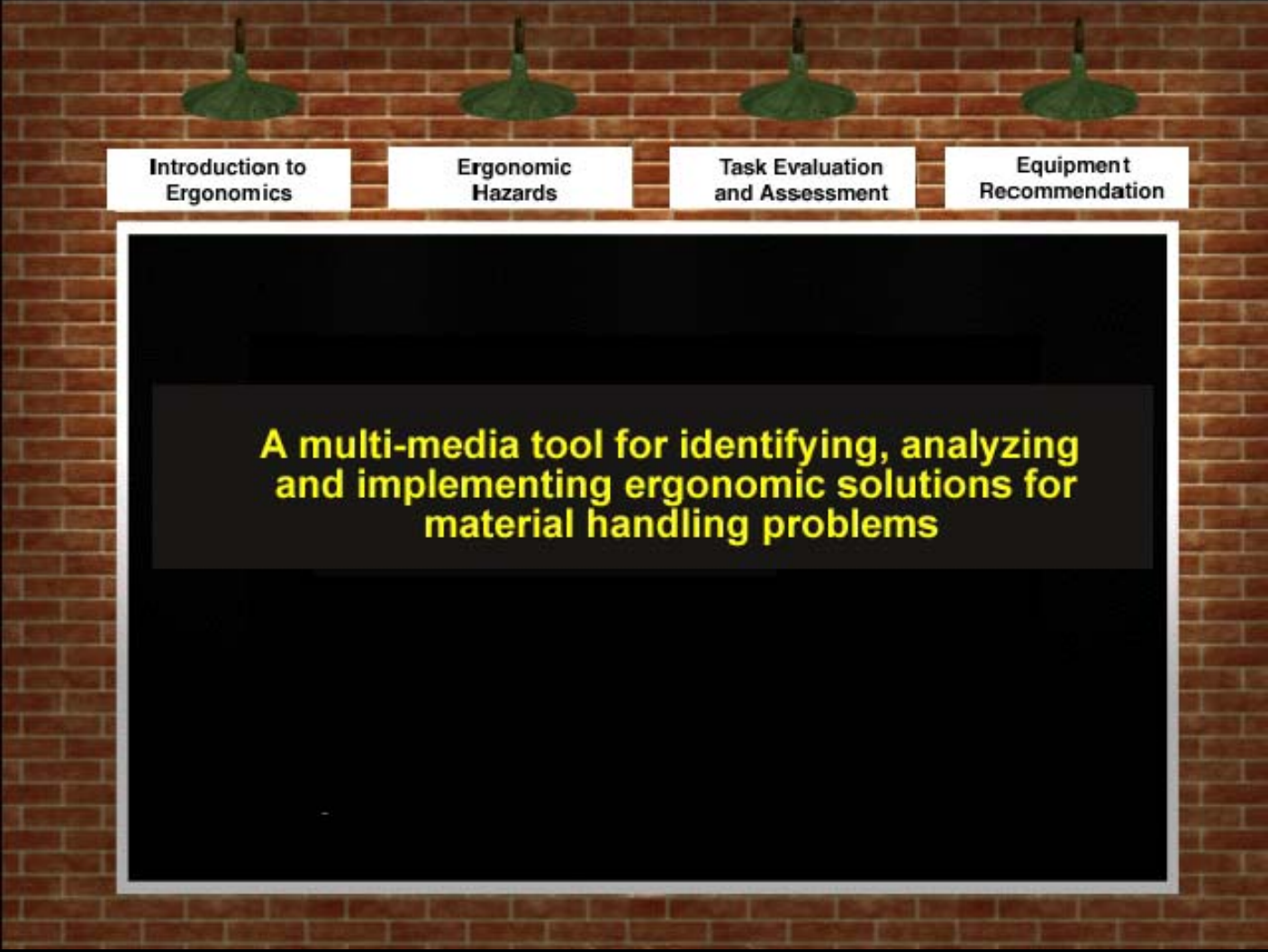
PLEASE KNOCK
TO ENTER

ERGONOMICS
TOOLBOX™

The Ergonomics Toolbox was ...

Designed As a Multimedia Soft Tool for
Practitioners -- It Is Not Directed to
the Research Community!

A Software in 4 Parts



Introduction to
Ergonomics

Ergonomic
Hazards

Task Evaluation
and Assessment

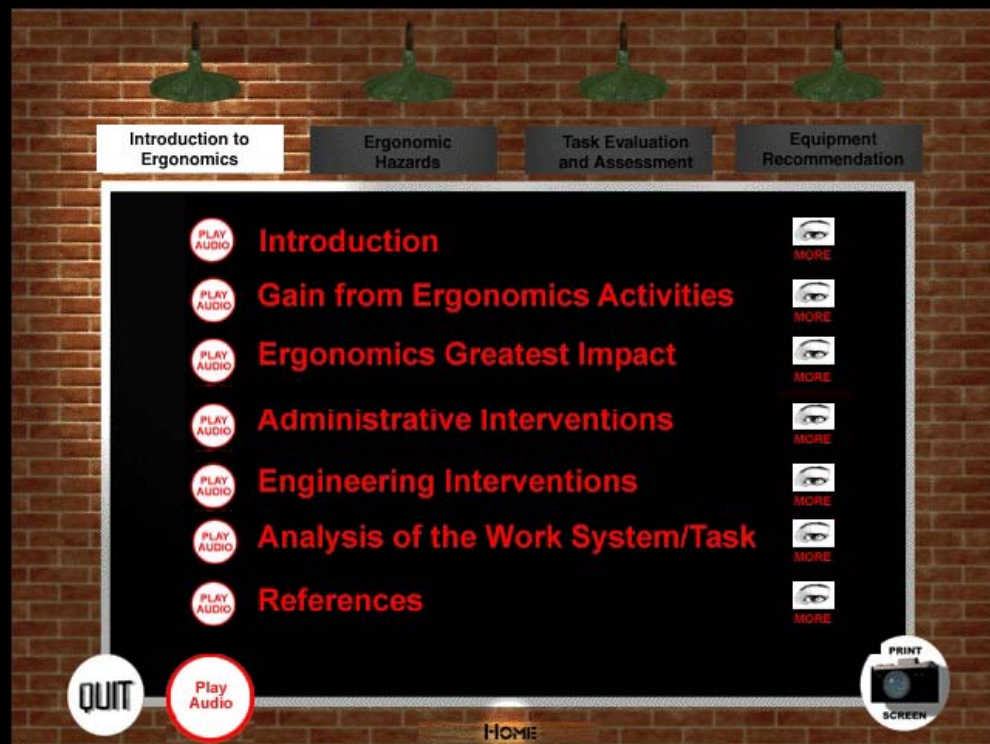
Equipment
Recommendation

**A multi-media tool for identifying, analyzing
and implementing ergonomic solutions for
material handling problems**

Part I Provides Definitional Information & Justification of Ergonomics

- Background information is provided to justify ergonomics programs
- Interventions methods are defined:

Administrative
&
Engineering



Part 2 Provides a Visual Definition of Ergonomic Terms

- Video shorts of MMH tasks
- MMH task can become ergonomic hazards:
 - excess repetitions
 - excess force
 - poor posture & environment

The screenshot shows a digital interface with a brick wall background and four green pendant lights at the top. A navigation bar at the top contains four buttons: 'Introduction to Ergonomics', 'Ergonomic Hazards' (highlighted in white), 'Task Evaluation and Assessment', and 'Equipment Recommendation'. The main content area is a dark rectangle with a white border. At the top of this area, a red-bordered box contains the text: 'Workplace tasks can become ergonomic hazards as a result of:'. Below this, a white-bordered box lists three items in red: '1. Excessive Force/Weight requirements', '2. High Frequency requirements', and '3. Poor posture'. Underneath, yellow text states: 'The video's included below will illustrate working definitions of common manual material handling tasks found in a typical workplace'. A row of six video thumbnails follows, each with a camera icon and a red label: 'Pick & Place Video', 'Feed Video', 'Hold Video', 'Reorientation Video', 'Reposition Video', and 'Reach In Video'. At the bottom of the interface are four circular buttons: 'QUIT' (white), 'Play Audio' (red), 'HOME' (white), and 'PRINT SCREEN' (white with a camera icon).

Part 3 Is the Ergonomic Task Evaluator

- User selects “problem task” from MMH study areas
- Data is drawn from the leading publications in ergonomics
- Hazards are flagged and “what-if” corrective scenarios can be rapidly investigated

The screenshot displays the 'Task Evaluation & Assessment' interface. At the top, it instructs the user to 'Check all material handling tasks that are found in the task being studied' and to 'Select the most critical activity for study from the drop down menus'. The interface is organized into five columns, each representing a task category: 'Pick and Place', 'Repositioning', 'Reorientation', 'Reach In', and 'Feeding'. Each category has a red thumbs-up icon and a list of sub-tasks. 'Pick and Place' includes 'Lift' and 'Lower'. 'Repositioning' includes 'Carry', 'Push', and 'Pull'. 'Reorientation' has no sub-tasks listed. 'Reach In' includes 'Lift' and 'Lower'. 'Feeding' includes 'Push' and 'Pull'. Each sub-task is accompanied by a small icon of a person lifting a box and the text 'view calculation'. At the bottom of the interface, there are several navigation buttons: 'QUIT', 'PLAY AUDIO', 'HOME', 'RESET', and 'PRINT SCREEN'.

Part 4 Proposes Integrated Ergonomic Solution

- Describes generic ergonomic equipment
- Takes system task descriptions and provides illustrations of potential integrated solutions to proactively address workplace design



That's the E.A.S.E. Council's

Ergonomics Toolbox



FINIS

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