The Bad Ergonomics of Order Fulfillment in the Retail Industry
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Manual Material Handling in Warehouses DC's and Retail Stores
Understanding the issues
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Understanding the issues
loading pallets on walkie riders

...from pallets sitting on the floor!
Handlers loading pallets on walkie riders
Some DC’s use double and even triple walkie riders

Remember these walkies only have 5” or 6” of vertical travel
and it doesn’t end here.....
In the retail environment all these goods need to get from the backroom to the shelf.
Understanding the issues

The shelves have grown in height .... ....and they are tightly packed
Understanding the issues

Case goods packaging has changed

...once the plastic is removed the bottom “flat” needs to be fully supported
Understanding the issues

Supporting the “flat” is awkward and leads to poor ergonomic …lack of efficiency

…and product damage.
Understanding the issues
Understanding the issues
Understanding the issues
But, since most companies are employing people like these folks there are no manual handling issues ....
The two largest issues effecting Workman’s Compensation costs are:

- Aging
- Obesity
Why Do Older Workers Work?

✓ Studies found many older workers plan to work past the traditional retirement age (Galinsky).

✓ This trend can be attributed, in part, to the reduced value of retirement portfolios/income. (Administration on Aging)

✓ A higher cost of living today (Administration on Aging)

✓ And they work because they want to, because:
  - they want to stay active
  - they are highly engaged in their work
  - satisfied with their jobs
  - committed to their organizations (Galinsky)
The Aging Workforce

Understanding the issues

- In 1972, average age of a US worker was 28. Today it’s 46.
- The number of workers aged 45+ has doubled since 1950.
- According to the AARP, the number of people 55 years and older in the labor force was about 18.2 million in 2000 – It rose to 25.2 million last year and it is projected to rise to 32 million by 2025.

1. Source Ergonomics ASSE Feb 2009 Vol 2, No2 – Dr. Ronald Porter, PT, CEAS, Director, Back School Atlanta, What Works with the Aging Workforce
As We Age....

- Maximal Strength
- Muscle Mass
- Bone density
- Visual and Auditory Acuity
- Fitness
- Aerobic Capacity
- Cognitive Speed/Function

- Gain Weight
- Arthritis
- High BP
- Diabetes
- Depression
- Heart Disease
- Menopausal & Post Menopausal Issues
Obesity in the Workforce

Definition of Obesity…..

Body Mass Index (BMI) of 30 or higher.

BMI: A measure of an adult’s weight in relation to their height and age.

Obese is generally defined as at least +30 lbs. overweight.
The Costs of Obesity

• More than one-third (34.9%) of U.S. adults are obese.

• Obesity-related conditions include heart disease, stroke, diabetes and certain types of cancer.

• The annual medical cost of obesity was $147 billion; the individual medical costs are $1,429 higher than those of normal weight.

Source: CDC NIOSH
The Effects of obesity

Obese workers....

...file twice as many WC claims
...have 13 more lost workdays.
...claim 6.8 times more medical claims under WC
...indemnity costs are 11 times higher.
...body parts most prone to injury are: back, lower extremities, wrist, and hands.

The most common causes of these injuries were lifting, lowering & slipping – a.k.a. Manual Material Handling.

Source: CNA Insurance
LIFTING
STRETCHING
REACHING
BENDING
STOOPING
and
WALKING

These unnecessary worker activities can result in serious problems
The effects of manual material handling represent the biggest single contributor to:

- *lost time injuries*

- *and the most Workman’s comp claims*

- *highest cost of Workman’s comp claims*
The manual material handling issues simply can no longer be ignored because of:

- Increased volumes of goods being moved
- Heavier unit loads (FedEx & UPS)
- Escalating WC costs
- Market pressure to do more with less (foreign pressure)
- Little training & limited supervision (retail)
- More obese workforce
- Aging workforce
- Higher shelving, tightly packed and flimsy packaging

Ergonomic initiatives and engineering interventions can significantly reduce the impact of these issues.
Finding balance .......
It is NOT balance because .......
Let’s look at some solutions

…..remembering there is no magic bullet

…..there is no single solution that works for all situations

…..it is likely that more than one solution would be appropriate.
MANUAL LOADING AND UNLOADING OF PALLETS CONTINUES TO BE ONE OF THE MOST COMMON AND MOST INJURY PRONE TASKS IN INDUSTRY TODAY
Opening up the pick slots
Spread pallets out......
Notice the top layer is about at the same elevation
As much as 40% of the time required unloading a pallet, can be spent walking around it!
Back bending, reaching out – serious issues and for the older worker or obese, a VERY serious issue
Load positioners automatically function holding the top layer of goods in the 30” to 40” window, greatly reducing the bending.

The turntable eliminates having to walk around.
Load positioners can be made portable. This provides for flexibility on where they can be used on cramped back rooms or congested work areas.
Some load positioners use air bags instead of springs.

...Careful, compressed air is needed to charge the air bag
Manual Turntables

For the backroom

......to transfer merchandise from pallets to U-boats or to stocking carts
Setting up a turntables in the backroom

One person can off-load cartons to U-boats just about as fast as two people without a turntable.
Pallet rotators make quick work exchanging pallets.

Damaged product on the bottom of a pallet can be easily removed.
Stackers powered up/dn and Full Power Stackers
Inexpensive stackers can transport pallets, stack them to free up floor space, load positioners and double as a positioner.
They are highly maneuverable in tight quarters and can eliminate the manual lifting.

These are inexpensive choices especially when compared to fork lifts.
Okay, so not everybody gets excited about Ergonomics!
Vacuum lifters fitted to articulated arms allows extended reach
Vacuum lifters are efficient and very useful in areas when sorting cartons or case goods require multiple pick and place tasks.
Vacuum lifters are highly efficient for handling cartons, bags and pails. They can be easily adapted and work well in a small work areas.
Powered two wheel hand truck
Manipulators to move and position material
Skid lifters

Manual and powered

Careful, can only be used with nestable, open bottom pallets or skids
Auto-positioning display systems

- Can be loaded with full pallets
- True customer convenience
- Ideal promotional space
- Proven to increase sales
- Sustainable and reduces waste
Containers

Manual loading and unloading of wire baskets, containers, gaylords and totes leads to incidents of upper & lower back injuries.
Containers
Understanding the issues
Understanding the issues

What is the container makes a huge difference
Understanding the issues
Understanding the issues
There are spring loaded positioners which elevate the goods in the container to speed picking the parts and eliminates the bending and reach issues.
These spring loaded positioners can be adapted fitted into carts, hampers, wheeled tubs and gondolas
High hinge tilters are ideal for gaining access to the bottom and back of containers.
What is in the container will effect the style of tilter needed to present the parts at the best ergonomic position.

- Hinge point
This a low hinge tilter. It can sit flat on the floor and be raised with a built-up base.
Corner Tilters

Excellent for granular material or other semi liquid material that flows
This unique tilter can raise/lower or tilt the container in any position to suite the operator.
Carts, Dollies, Platform Trucks and U-boats
They come in all shapes and sizes and to gain the maximum benefit should be applied to the application.
Rule #1 – don’t overload a cart!
Rule #1 ....even if you have help moving it
Rule #1 ......or even if it has a motor!
New specialty cart shows real promise in retail stocking

Adjustable height shelf

Eliminates going up & down a step stool
These lightweight aluminum stackers are highly maneuverable...

...they provide easy access to loads

...and increase efficiency and productivity!
Adjustable height carts with a tilt stand positions totes

This?

Or This?

Speeds stocking and eliminates the stressors.
Good ergonomics!
Wheel and Caster Technology

Examples of good applications

Platform elevated
Correct push bar height
Larger wheels

Examples of poor applications

Platform too low
No push bar
Wheels too small
Calibrated spring provides linear moment and it is adjustable
Some solutions not only solve the back problem, they can eliminate wasted motion and increase efficiency.

Battery powered scissors lift
Self leveling Uboats

Calibrated spring provides linear moment

These can be retro-fitted to existing Uboats
Calibrated spring provides linear moment
Self leveling floats bring the bottom half of the load...

....into the correct operating range which eliminates bending and reduces reaching
The wheel choice can have a huge impact on the rolling friction of any cart, dolly or portable rack.
Roller conveyor can be used in rack and shelving to reduce the stress on storing or retrieving heavy cases and cartons.
Carton Flow - Retrofit Application

Pick Rates

Pallet Rack
Static Storage

Carton Flow
Dynamic Storage

Average Pick
5.2 Sec

3.0 Sec
High density vertical storage systems speed order picking and put each item at the correct height.
This vertical carousel storage system puts all the parts at the correct ergonomic elevation.

Pick to light
This expandable conveyor is driven right into the truck.

The individual boxes and cartons are conveyed out.

Notice how the odd sizes and shapes are handled easily by a single piece of equipment.
This expandable conveyor is driven right into the truck.
Ergonomic Guidelines for Manual Material Handling

Free download

Ergonomic Guidelines for Manual Material Handling
Thank you!

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