



Justin Azbill

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Milwaukee Tool

**SAFETY & HEALTH
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FOR ALL SAFETY PROFESSIONALS
2024



Transitioning Your Workforce to a Better Ergonomic Mindset

Raffle Prizes



Raffle #1



Raffle #2



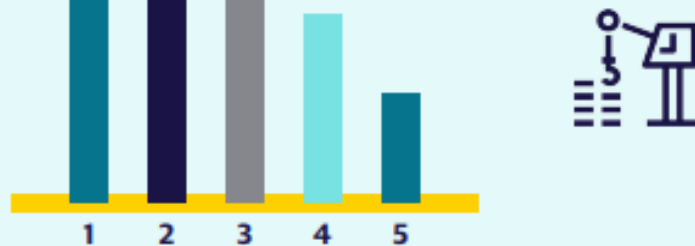
Table Top Mesa Solo Stove

Raffle #3

Construction Industry Top 5 Risks



Total workers compensation direct costs for non-fatal claims with more than five days away from work



	Cost billions	Percent total	
1.	\$2.50	24.1%	Falls to lower level
2.	\$1.70	16.7%	Struck by object or equipment (Being hit by objects)
3.	\$1.48	14.2%	Overexertion involving outside sources (Handling objects)
4.	\$1.36	13.1%	Falls on same level
5.	\$0.79	7.63%	Pedestrian vehicular incidents (Being hit by vehicles)

Looking for more comprehensive safety information?

As a policyholder, you have exclusive access to risk control tools and resources through Liberty Mutual SafetyNet™

visit lmi.co/safetynet

The top five injury causes account for over \$7.87 billion in costs and represent 75.8 percent of total workers compensation direct costs for non-fatal claims with more than five days away from work in the construction industry.

Understanding top risks in the workplace is the first step to protecting your business. Did you know: Liberty Mutual SafetyNet™ has sophisticated technical resources to help prevent falls, overexertion, and many other construction-related exposures.

Scientific methodology: The 2020 Liberty Mutual Workplace Safety Indices are based on 2017 data from Liberty Mutual, the U.S. Bureau of Labor Statistics (BLS), and the National Academy of Social Insurance. BLS non-fatal injury data are analyzed to determine which events caused employees to miss more than five days of work, and then rank those events by total workers compensation costs.

Note: Falls to lower level as a top driver of loss is unique to construction. Ladder falls likely represent a common scenario for these falls, and their cost is generally high because they lead to fractures or multiple-body-part injuries.

Construction Industry Projected Growth



Projections

Projections on job growth for Construction Laborers from the Bureau of Labor Statistics. The 10-year

national workforce is projected to grow 3.71%, but Construction Laborers are expected to see a growth

of 5.39% over the same period. This occupation is expected to grow more than the national average.

Job Growth

5.39%

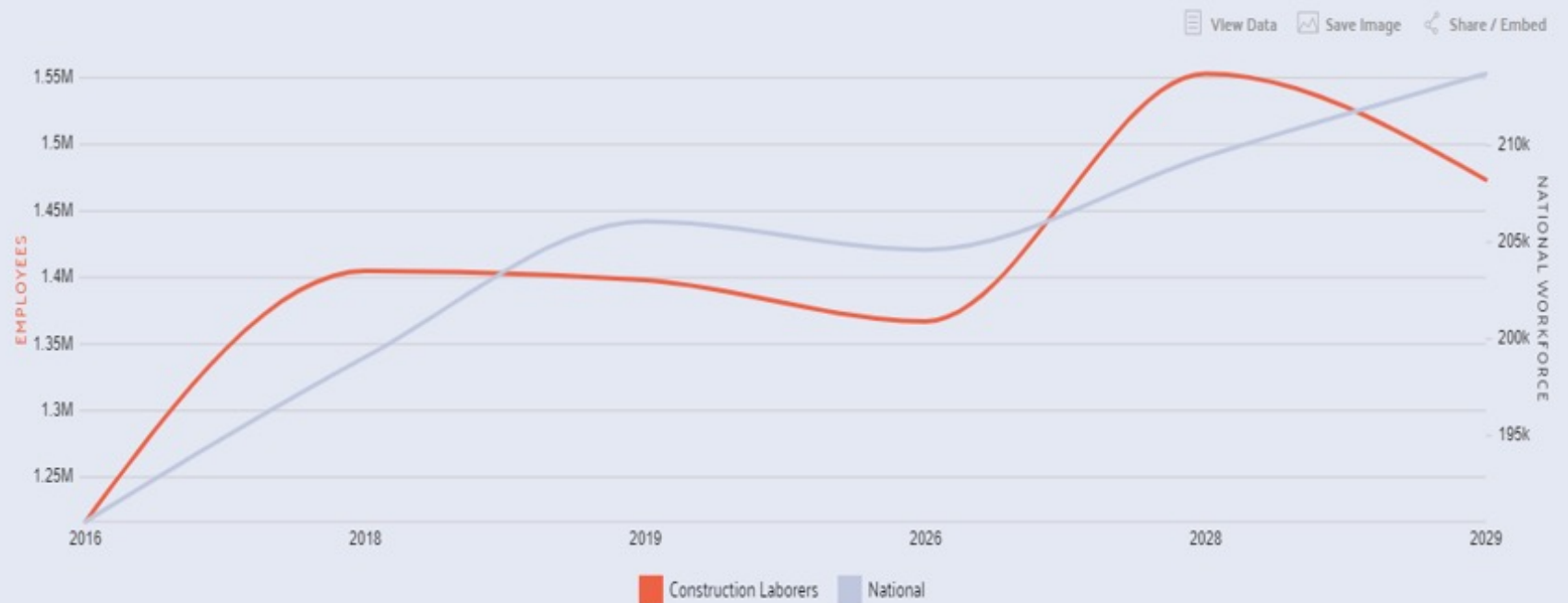
ESTIMATED JOB GROWTH
10-year Projection

3.71%

NATIONAL GROWTH
10-year Projection

This line chart shows the projected 10-year growth in the number of jobs for Construction laborers. This profession is expected to grow more than than 3.71%, the average rate of national job growth.

Data from [the Bureau of Labor Statistics BLS Statistics by Occupation, Growth](#).



What is Ergonomics?

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- Ergonomics is “the study of work”
- It is an applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely.
- It is the process of making the job fit the person that is doing it instead of trying to make the person fit into the job.
- The primary focus is to reduce the amount of stress an employee feels so that he or she can more effectively do their job.

What's at risk?



Great ergonomic solutions often go **un-noticed** when done correctly...

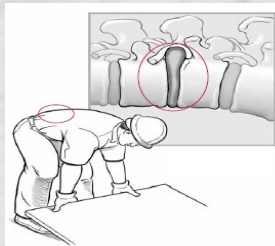
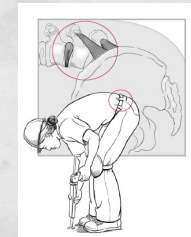
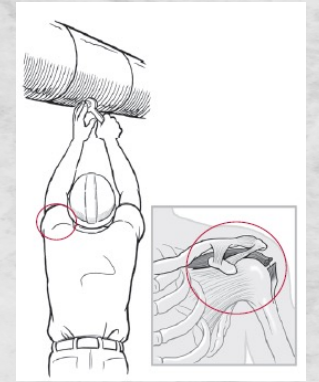
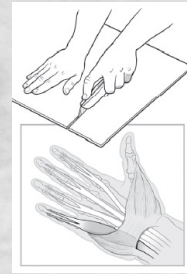
BUT, when developed **incorrectly**, it effects users and the entire ecosystem of the jobsite.

Users suffer from:

- Pain, blisters, bruising, or discomfort
- Muscle fatigue in hands, arms, shoulders, and back
- Chronic pain due to repetitive use and time – Opioid Addiction?

These effect more than just the user...

Companies suffer by loosing money / Health care costs/ Schedule delays



Ergonomic spectrum

Integrated into Milwaukee's development process
but often varies due to the solutions needs.

Common ← **Ergonomic Development Spectrum** → Specialized



Products that will be held or
interacted with by users
(Almost everything)



Handle sizes, accessibility and
placement of features
(75-85% percentile male)



High grip force tasks that require a
sensitivity to form and handle size



Highly repetitive tasks that require high
force or weight.
The most important for ergonomic studies.

Picture This....

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We study our core end users with the same amount of focus as others might study professional athletes



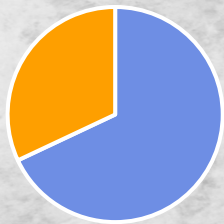
Driving for optimal safety and performance for the longevity of an entire career

Messaging Ergonomics – Is it being HEARD?

Safety Professional

1. Do you message or plan for Ergonomics Daily?
2. Do you message or plan Ergonomics Weekly?

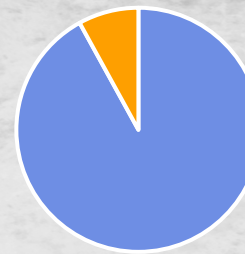
Question 1



completed	68%	17
not compl	32%	8

■ completed ■ not completed

Question 2



completed	92%	23
not compl	8%	2

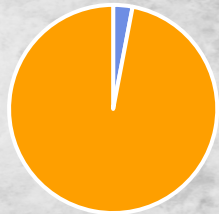
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Messaging Ergonomics – Is it being HEARD?

Trade Professional

1. Do you message or plan for Ergonomics Daily?
2. Do you message or plan Ergonomics Weekly?

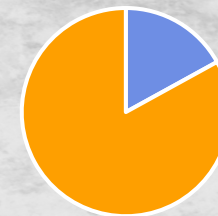
Question 1



		100
completed	3%	3
not compl	97%	97

■ completed ■ not completed

Question 2



		100
completed	17%	17
not compl	83%	83

■ completed ■ not completed

Messaging Ergonomics – Is it being HEARD?

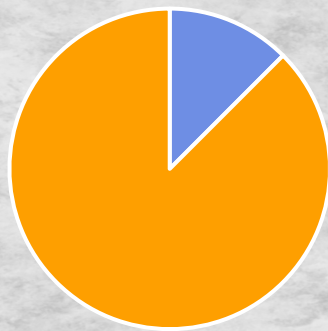


Both Groups

1. Does your ergonomic training include Tools?

Safety Pro's

Question 3

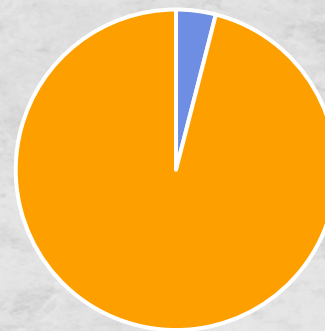


■ completed ■ not completed

		25
completed	12%	3
not compl	84%	21

Trade Pro's

Question 3



■ completed ■ not completed

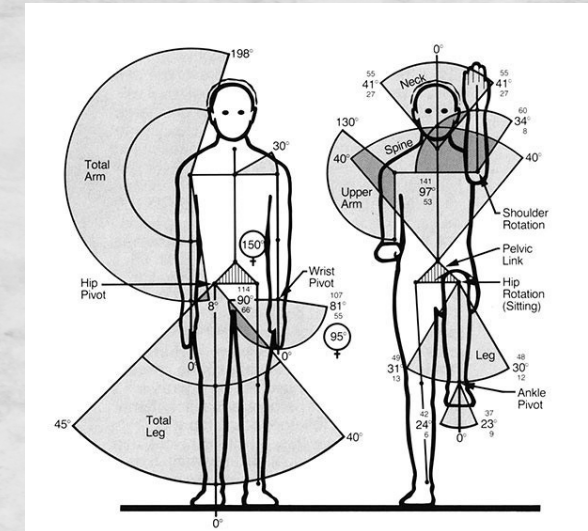
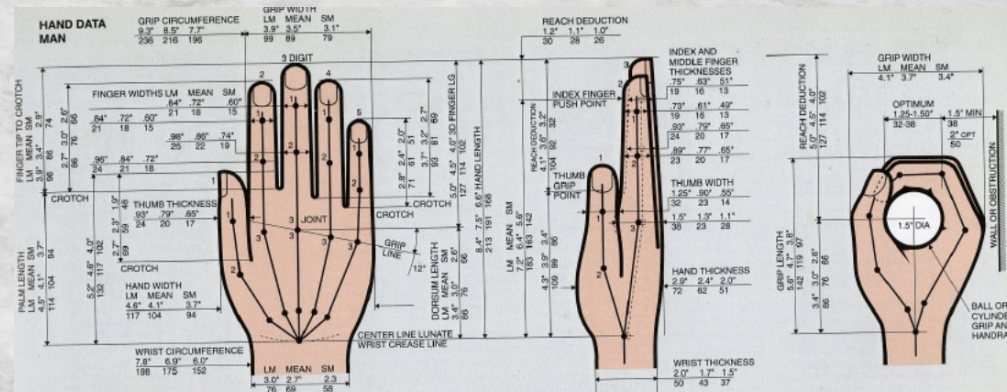
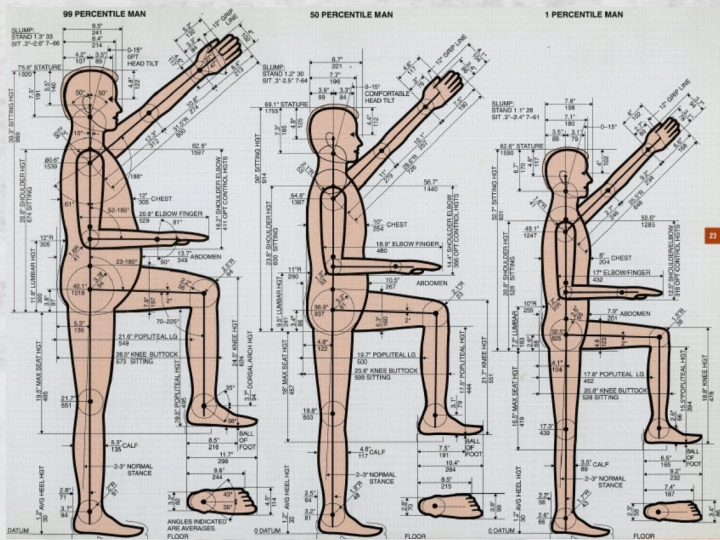
		100
completed	4%	4
not compl	96%	96

Ergonomic Database



Anthropometry the scientific study of the measurements and proportions of the human body such as size, weight proportion, mobility and strength.

This data is well documented and referenceable from Military Records and hundreds of public studies over several decades.



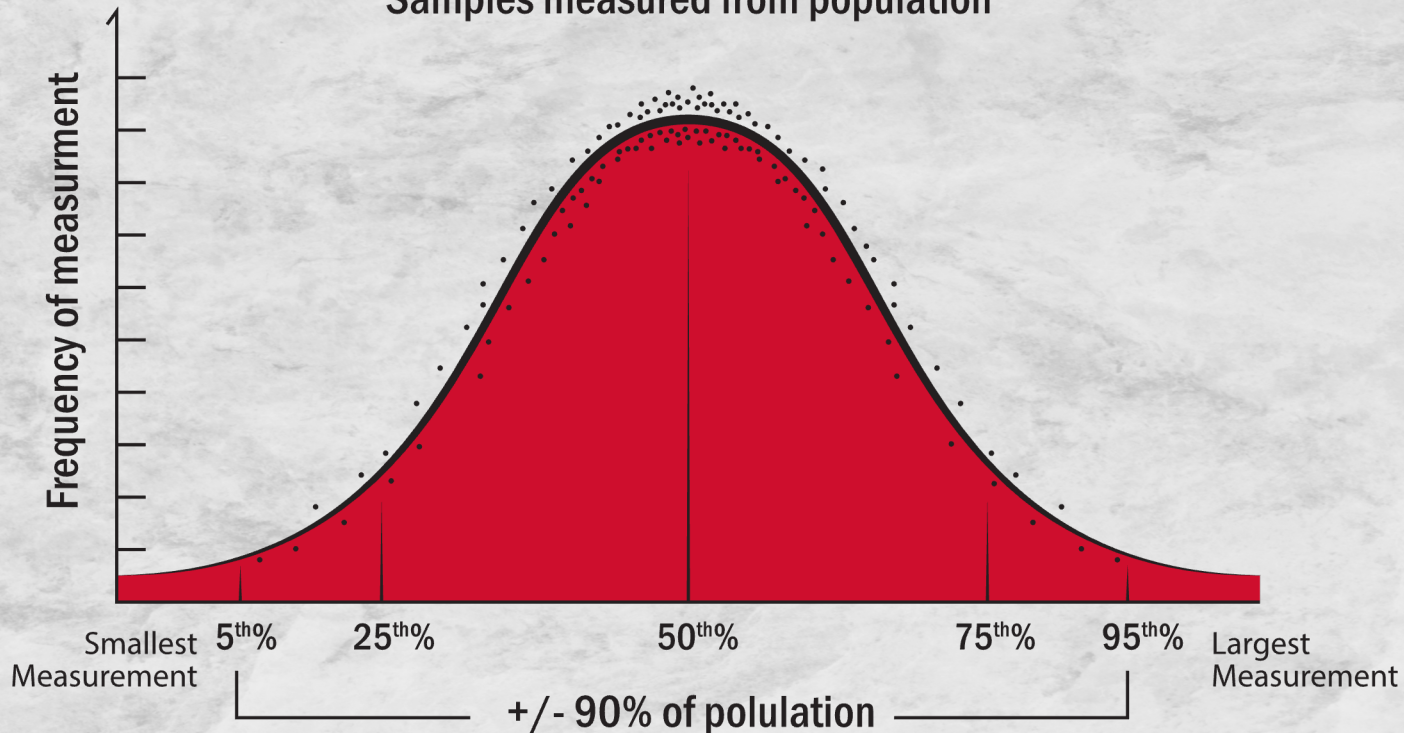
Most manufacturers use this type of data to decide on the sizes, weights, and proportions of products to enhance the efficiency, safety and comfort of our user.



Not all people are the same size. There is a huge difference between the heights, weights, and other dimensions due to gender, age, ethnicity, diet, and genetic make up

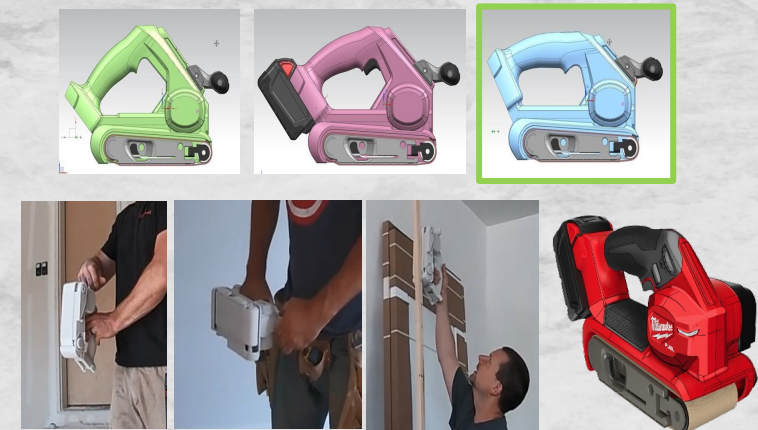
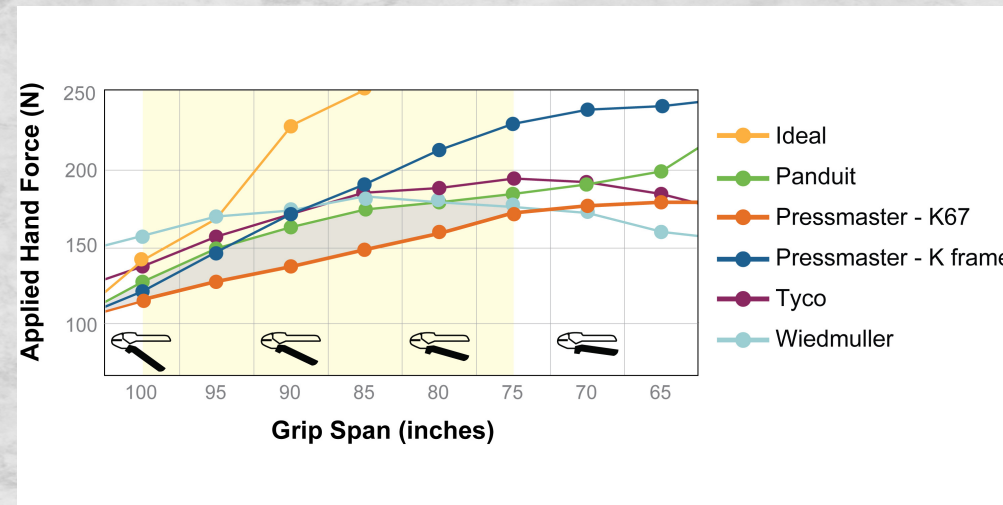
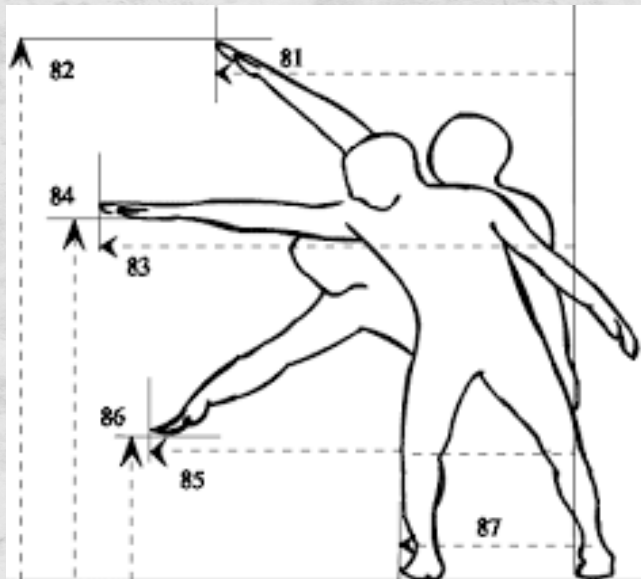
Samples measured from population

Bell Curve



Functional Anthropometry

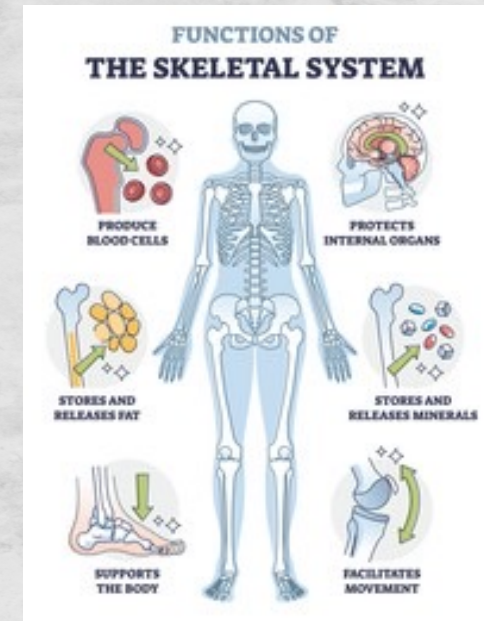
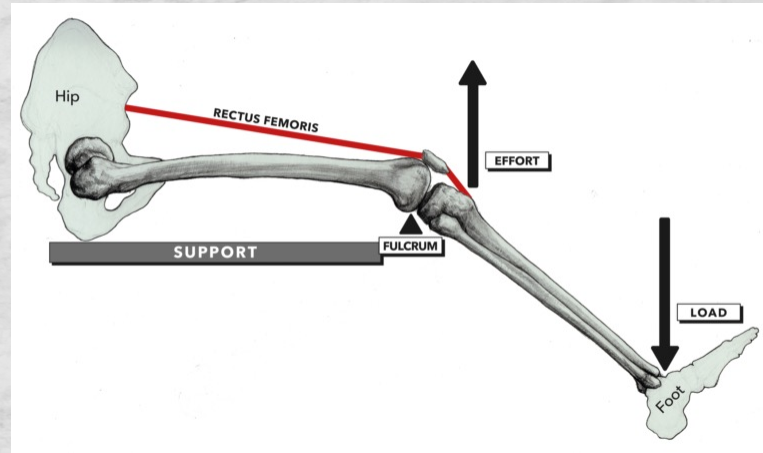
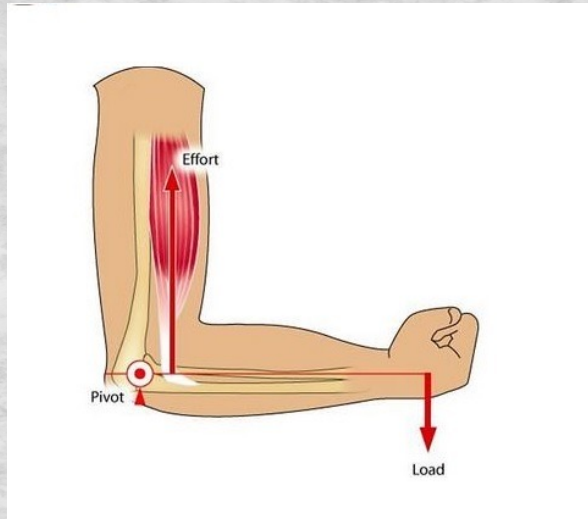
Measures the dynamic properties of the human body relevant to tasks or activities.



Examples are range of motion of various joints, force of limb movements (i.e. leg pushes), and reach zones during such as standing, bending and sitting.

Skeletal System Purpose

Skeletal system acts as the support structure for your body. It provides the rigid framework to which organs softer tissues such as muscles and tendons attach. It encloses and protects vital organs.



Bones act as levers when muscles contract, causing pivotal motion at a joint. Bones are most commonly 3rd class levers which can create a high level of stress on joints such as the elbow joint.

Muscle Effort Analysis

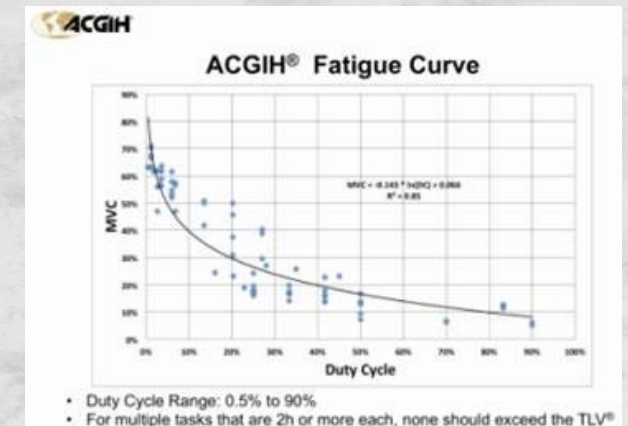
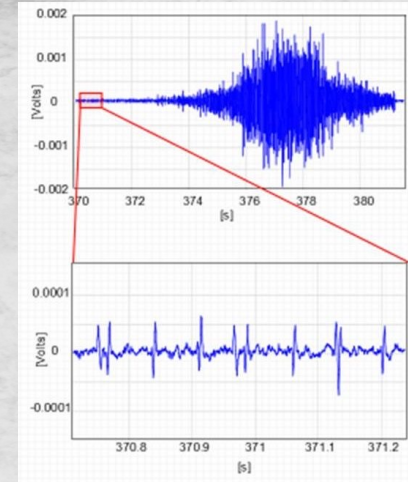
Ideally muscle effort is maintained under 20% MVC during a workplace task.

Muscle effort exertions that exceed approximately 20% of an individual's maximum voluntary contraction (%MVC)

- Contract muscle to the point of partially impeding oxygenated blood flow; decreased venous return
- Decreased oxygen to muscles
- Increase blood pressure
- Causes contraction to be anaerobic which depletes quickly
 - Fatigue sets in and muscle force decreases

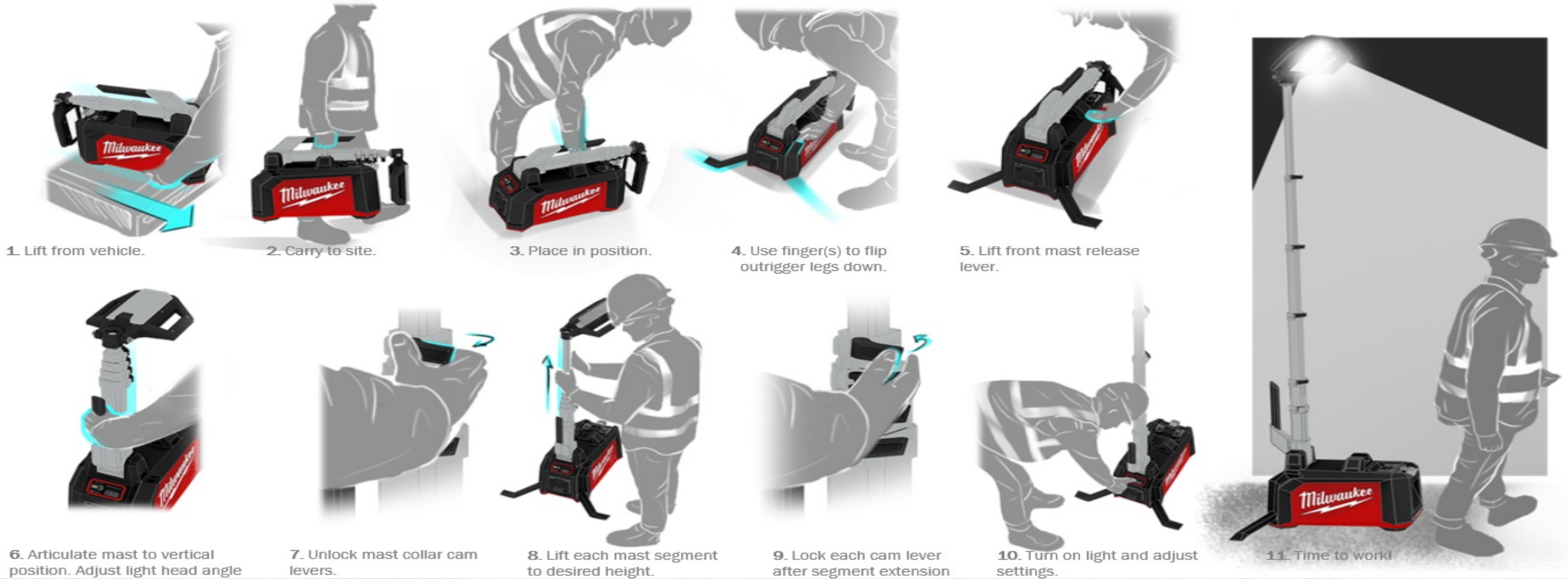
Peak exertions of 60% MVC or higher

- Contract the muscle to the point of restricting oxygenated blood flow to or from the muscle. These events may be considered the first thresholds to localized muscle fatigue and increase risk for ergonomic injury.



Story Board – Start / Finish

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Story Board – Start / Finish

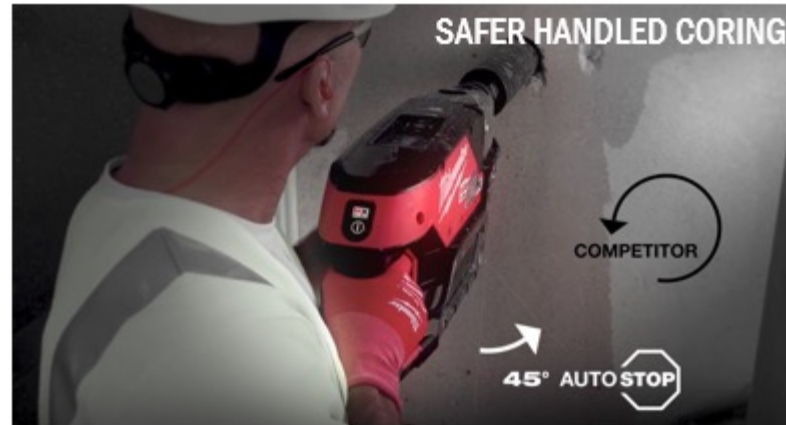
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30
degrees

90
degrees

180
degrees



REQUIRES UP TO 55-66% LESS MUSCLE EFFORT TO
CONTROL TOOL DURING CLUTCHING EVENT



UP TO A 47%
REDUCTION OF
PEAK MUSCLE
EFFORT THAN
MANUAL
SOLUTIONS

MILWAUKEE® SOLUTIONS



**FITS IN
BUCKET
CORNERS**
MAXIMIZE AERIAL
BUCKET SPACE



**QUICK ACCESS
IMPACT HOLDER**
STORES IMPACT WITH
BIT ATTACHED



**LASTING
DURABILITY -
REINFORCED
FRAME**
HOLDS UP TO 65LBS.

Story Board – Start / Finish

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REDUCE THE RISK OF MSD INJURIES OPTIMIZED HANDLE DESIGN

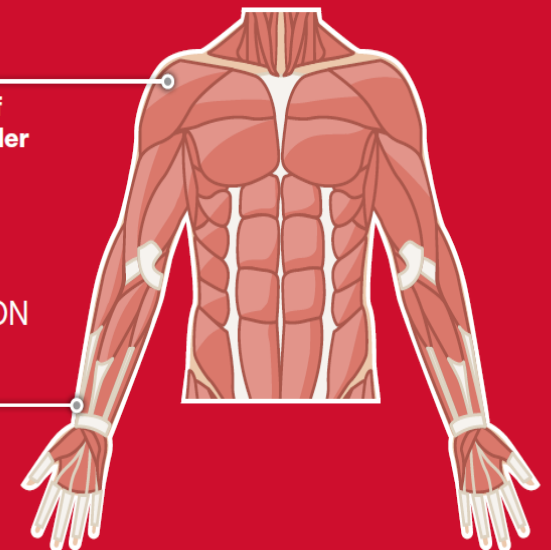


35 – 45° REDUCTION IN
SHOULDER FLEXION

Reduced Risk of Rotator Cuff
Injuries and Tears in the Shoulder

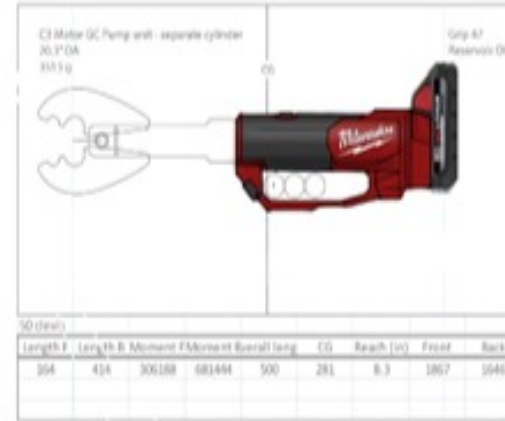
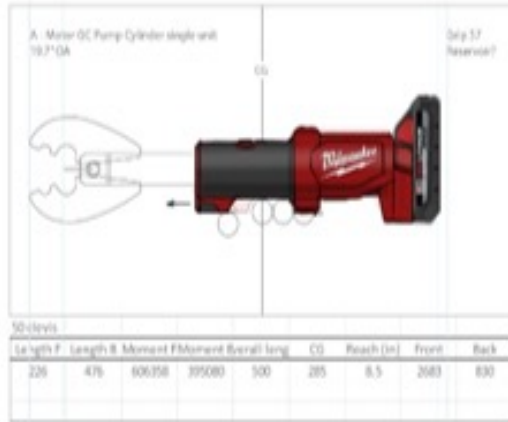
NEUTRAL FOREARM POSITION
ELIMINATES EXTERNAL
SHOULDER ROTATION

Improved Posture and Lower
Muscle Stress in Application

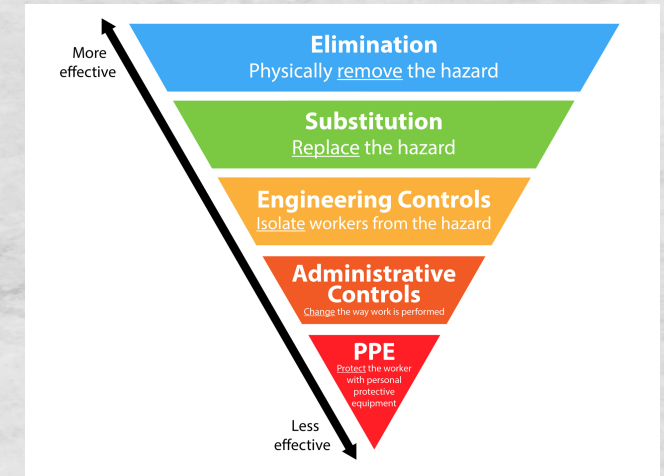
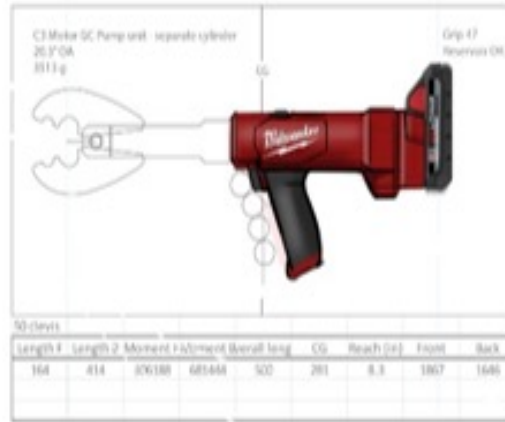
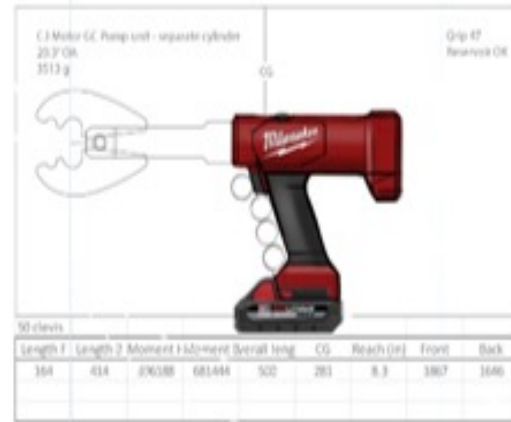
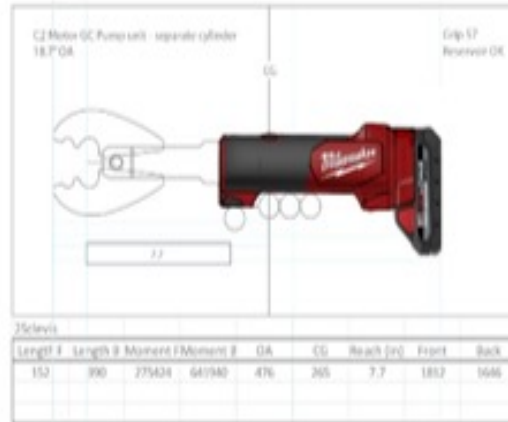


Not All Tools are the Right Tool.

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TEST MULTIPLE MECHANICAL LAYOUTS TO VALIDATE



Not All Tools are the Right Tool.

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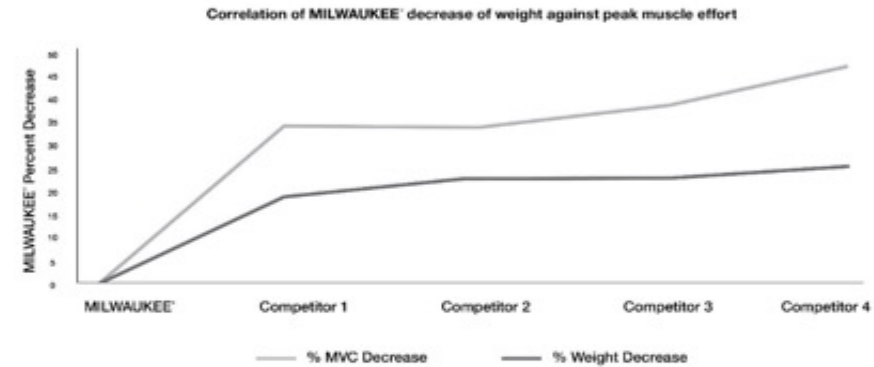
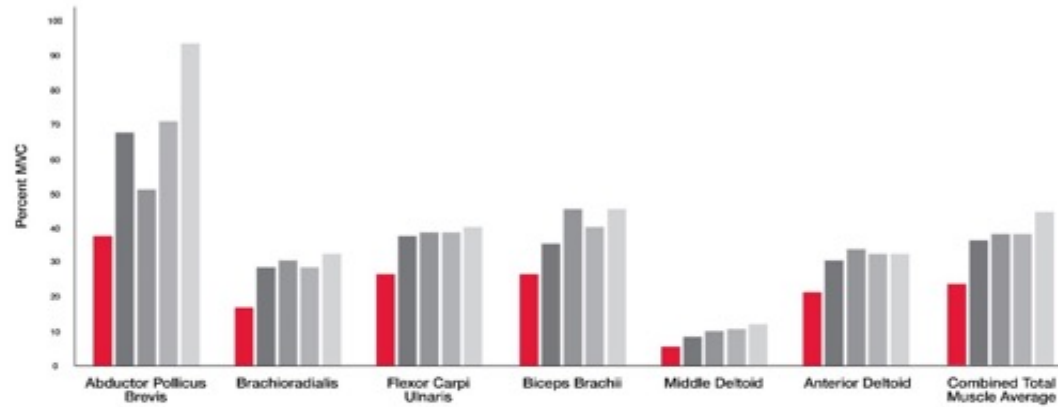
	Milwaukee Tool 12T Crimper	Leading Competitor
Weight	12.2 lbs.	15.85 lbs.
Speed	21.5 seconds	24 seconds
Balanced Center of Gravity	Yes	No
Maneuverability	350°	350°
Length	15.9 inches	16.5 inches
Trigger Activation	Two	Two
Muscle Effort	23% MVC	37% MVC



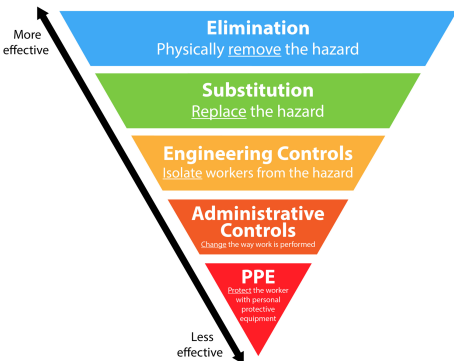
Balance of the Tool...



≈ 1 lb of Total Weight Reduced Decreases Muscle Effort By 11%



12T Crimper Evaluation



Not All Tools are Created Equal

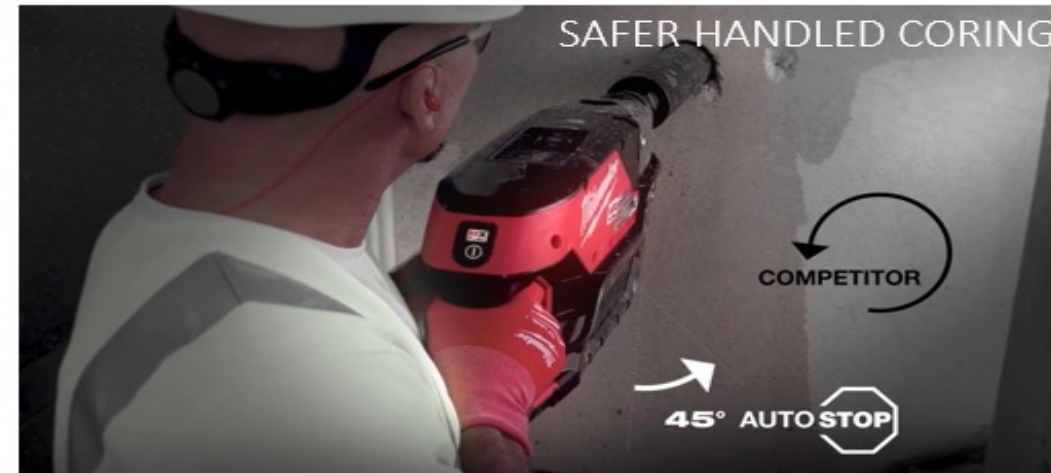
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UP TO 97% LESS MUSCLE
EFFORT TO START
COMPARED TO A PULL
START



REQUIRES 80% LESS
MUSCLE EFFORT
THAN HAND TOOLS.



REQUIRES UP TO 55-66% LESS MUSCLE EFFORT
TO CONTROL TOOL DURING CLUTCHING EVENT



UP TO A 47%
REDUCTION OF
PEAK MUSCLE
EFFORT THAN
MANUAL
SOLUTIONS

UP TO A 75%
REDUCTION OF
PEAK MUSCLE
EFFORT THAN
MANUAL
SOLUTIONS



Not All Tools are Created Equal

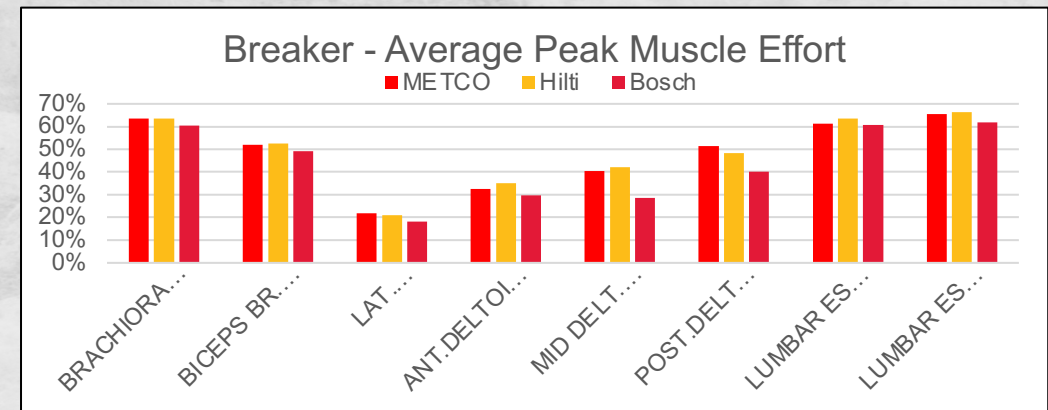
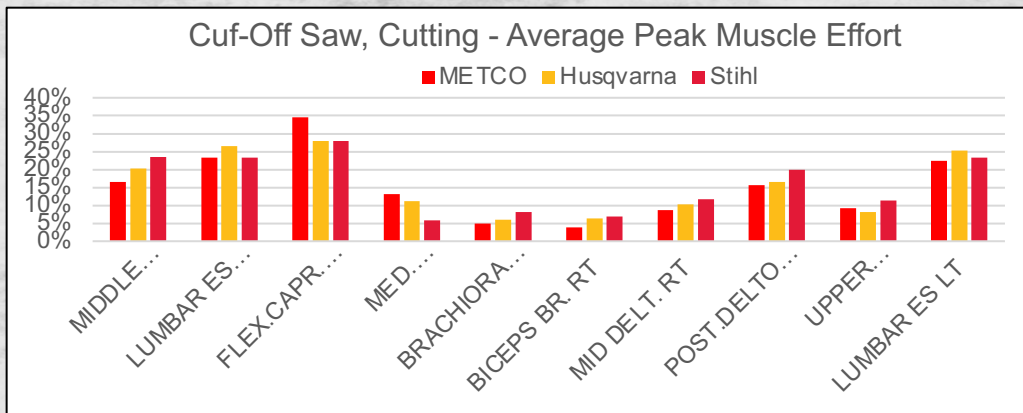


Dimension	Milwaukee	Hilti	Bosch
Weight	67.7lb	70.7lb	68.6lb
Handle to Back	3.25"	4.5"	4.5"
Handle Width	25"	23.5"	24.5"
Handle Height	35.25"	35.5"	33.25"
Tool Height	42.25"	41"	40"

MX CUT-OFF SAW CUTTING EFFORT IS SIMILAR TO COMPETITORS

Dimension	Milwaukee	Husqvarna	Stihl
Weight	67.7lb	70.7lb	68.6lb

MX BREAKER REQUIRES SIMILAR OR MORE USER EFFORT THAN COMPETITORS



Telling the Story – Successes

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Mechanical Firm – New England

OSHA RIR

Year 1 – 4.69 - \$1.1 Million Direct / Indirect Costs

Year 2 – 3.12

Year 3 – 1.22

Year 5 - 0.88 - \$55,000 Direct / Indirect Costs

- Body Position / Posture
- Weight of Tool / Materials
- Lighter Pipe Racks / material carts (Ergonomic Design)
- Workstations – adjustable heights
- Minimized Work on Ladders (use of lifts increased)
- Training Program (1–3-year Apprentices)
- Foreman Training Program
- Daily Ergo Plan

Utility Provider – New England

Common Injuries Cause: 2021

85% of incidents Musculoskeletal Disorders.

- Shoulder (Rotator Cuff Tear)
- Elbow Tendonitis
- Bicep Tendonitis
- Knee Injuries
- Lower Back

Lowered Rate by 40% 2023

- Tool Selection / Safety Features and Weight
- Body Posture
- Accessories / attachments
- Power Tool vs Manual
- Workstation Access
- Training Increased – Daily Ergo Plan



Thank You! Scan and message me for
Monthly Information.



Justin Azbill

Director - National EHS at Milwaukee Tool



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