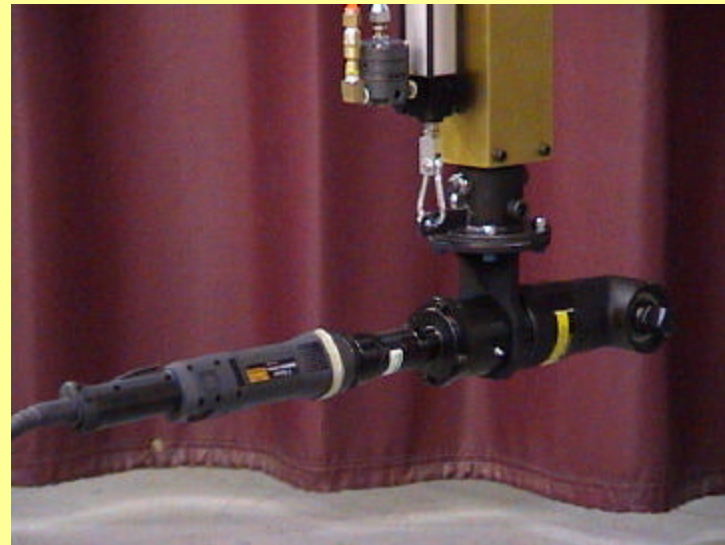


Ingersoll-Rand

Zimmerman Handling Systems

Torque Reaction Products



Training Objective

The Learning objective of the Torque Reaction Product Module is to learn:

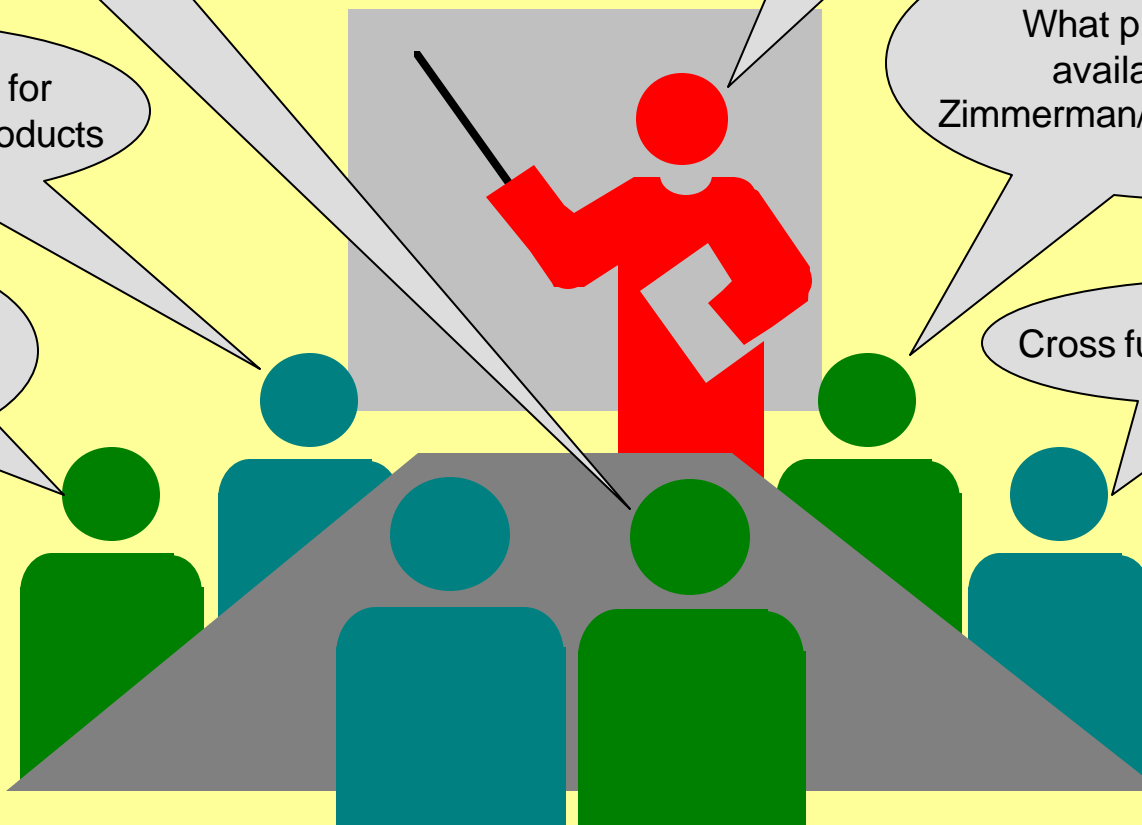
What are the advantages of using a Torque Reaction Product?

Application data for Torque Reaction Products

Tool holder products and considerations

What products are available from Zimmerman/Ingersoll-Rand?

Cross function possibilities



Summary



The success of any application is the ability to provide the right product for the right application



Providing a customer with the right product will ultimately help combat operator fatigue and can result in lowering costs associated with worker compensation



Although the products in the torque reaction line have been designed for assembly tools, possibilities for other uses are only as limited as your imagination



Module Preview

1. The metric SI unit for Torque or moment is the _____.
2. To convert foot pounds-force to Newton-meters multiply by _____.
A) 0.73756 B) 1.35582 C) 3.1415
3. The Torque reaction product that has the largest amount of vertical travel is the _____.
4. If the capacity of a cylinder is 177 lbs. @ 100 psi, the capacity be at 60 psi would be _____?
A) 106 lbs. B) 88 lbs. C) 142 lbs.
5. (T/F) The EZ Torque Tube is the only torque reaction product that is constructed out of Stainless Steel?
6. (T/F) The Light Duty Tool Arm can only be mounted on a column.
7. (T/F) to select a torque reaction product, you must know the Torque rating of the tool being used.

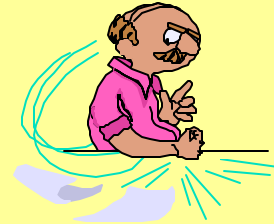
Torque Reaction Product Advantages



Combat operator fatigue



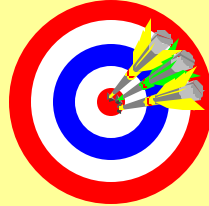
Eliminates the possibility of dropping a tool and causing costly damage



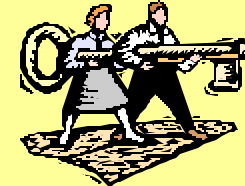
Absorbs the pounding reaction of torque tools



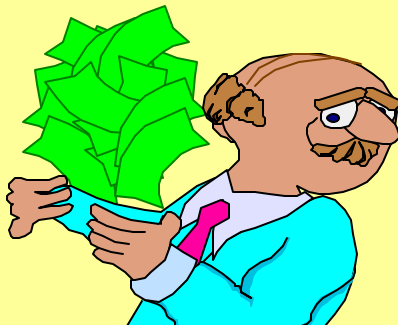
Brings added safety to the workstation



Improves torque repeatability, thereby increasing joint reliability



Relieve operator of the tool weight



These products can help prevent the long term damaging effects of torque reaction on the human body. This can result in lower worker compensation and healthcare costs.

Torque Reaction Products



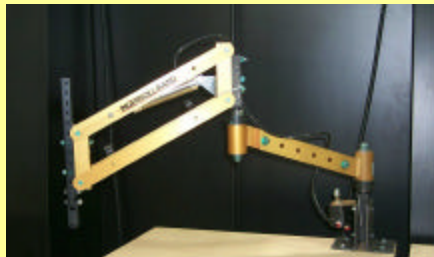
EZ Torque Arm



Tool Holders



EZ Torque Tubes



Light Duty Tool Arm



Medium Duty Tool Arm

EZ Torque Arm



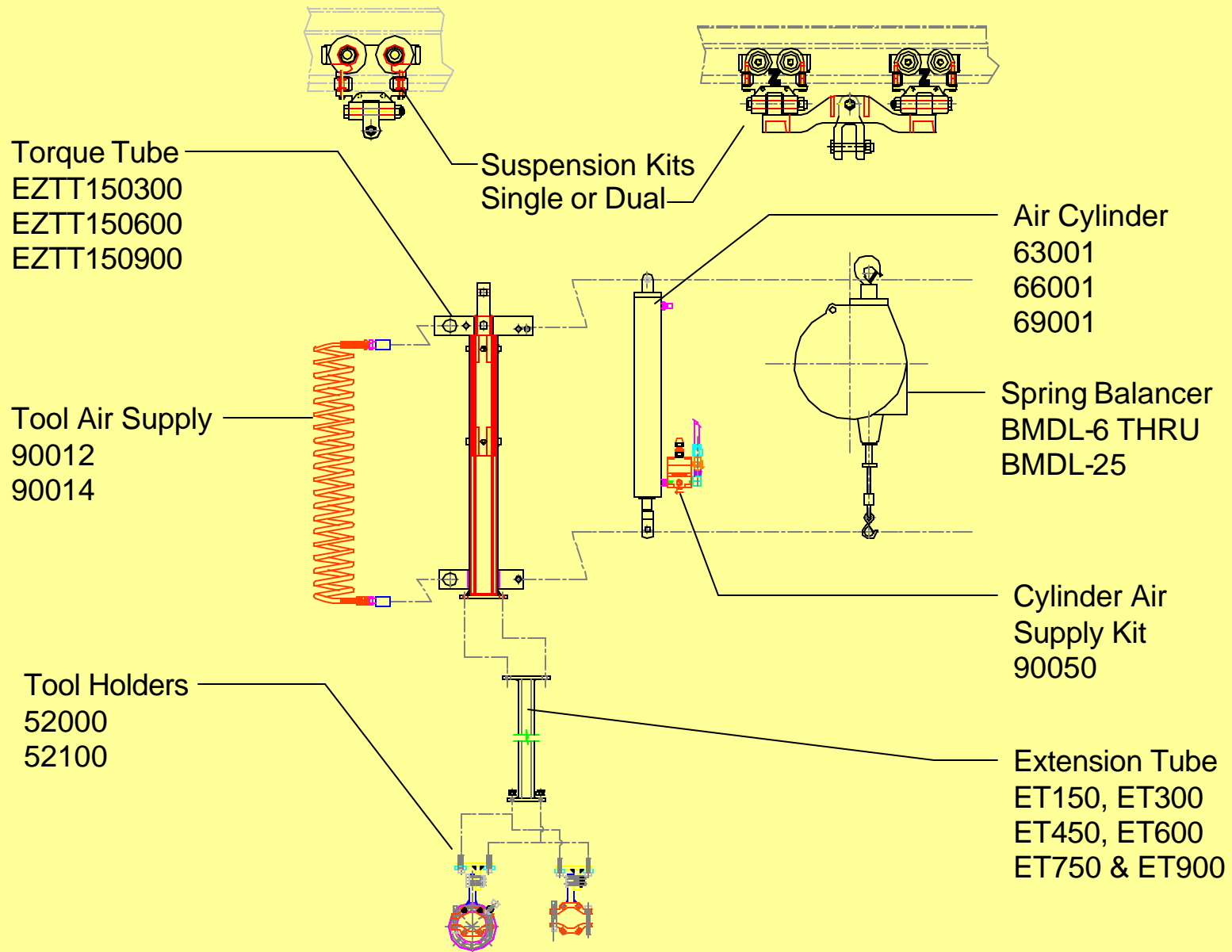
- Utilizes 50 lb. Tool Balancer
- Equipped with BA (Balance Air) controls
- 48" (1219) mm Travel
- Roller Bearings for smooth operation
- Absorbs 100 ft/lbs.(135 Nm) of Torque
- Adjustable For Different Tools
- Constructed of Cast Aluminum & Steel
- Can be trolley or rigid mounted

EZ Torque Tube

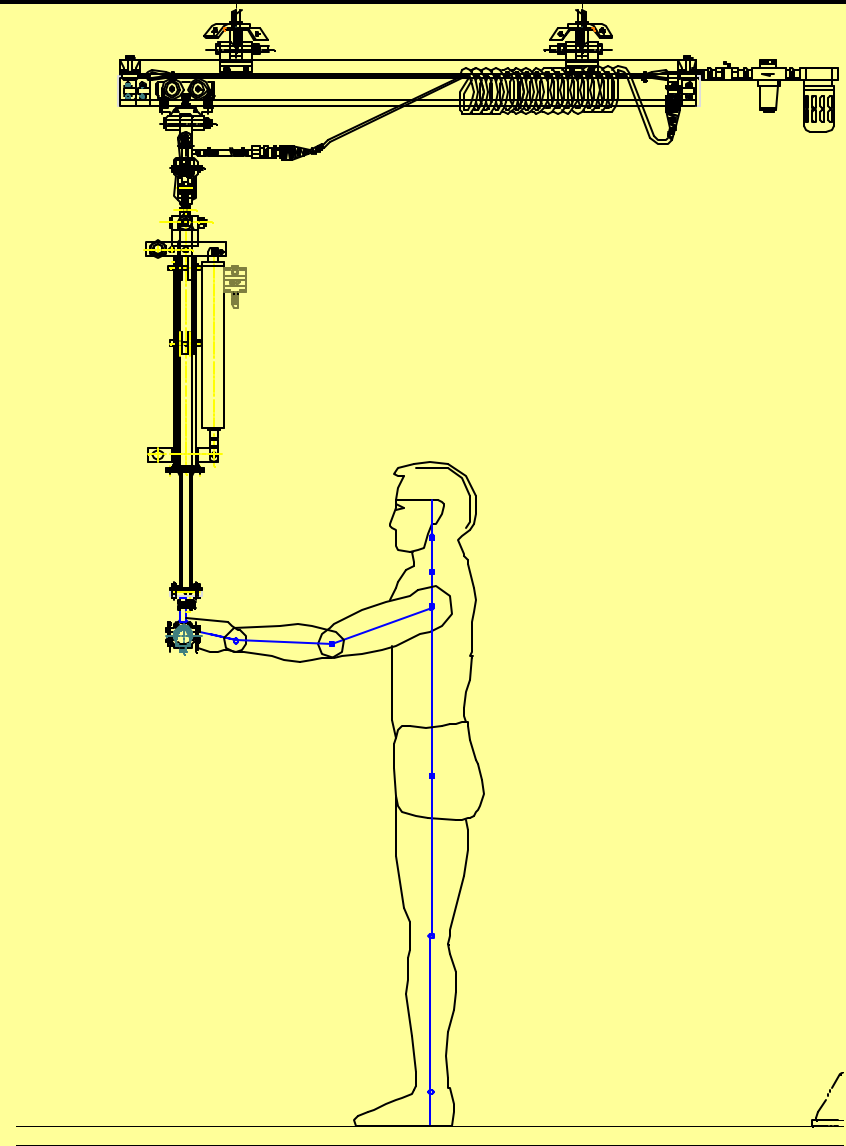


- Effortless vertical travel
- Relieves operator of tool weight and torque
- Suspension kits for a variety of rail products
- Constructed of 304 stainless steel
- Low friction Rulan LR bearing plates for maintenance-free operation
- Low friction 1-1/2" bore cylinders utilizing BA controls will balance loads up to 100lbs
- Available in 300mm (12"), 600mm (24") and 900mm (36") stroke lengths
- Absorbs 150Nm (110 ft/lbs.) of torque

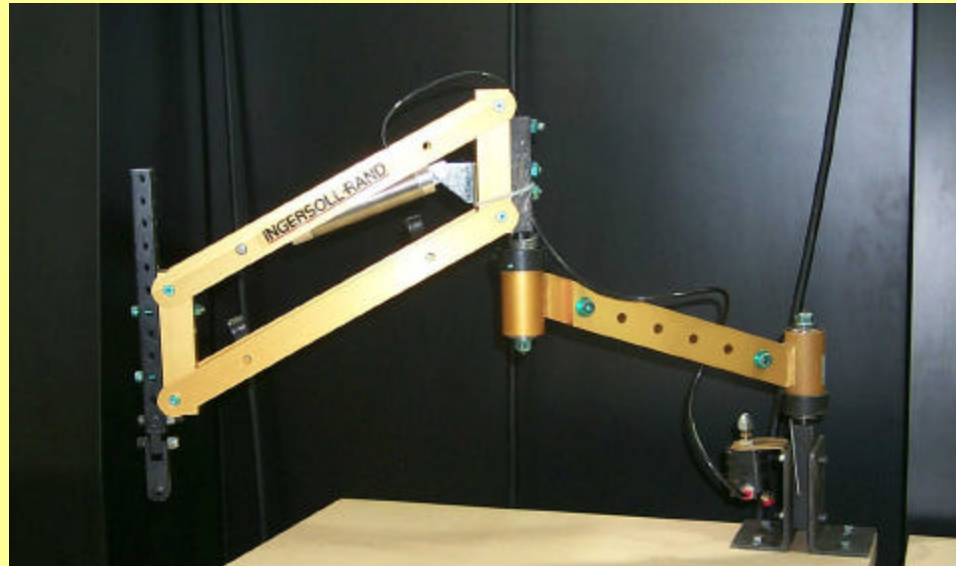
Torque Tube Components



Typical Torque Tube Applications

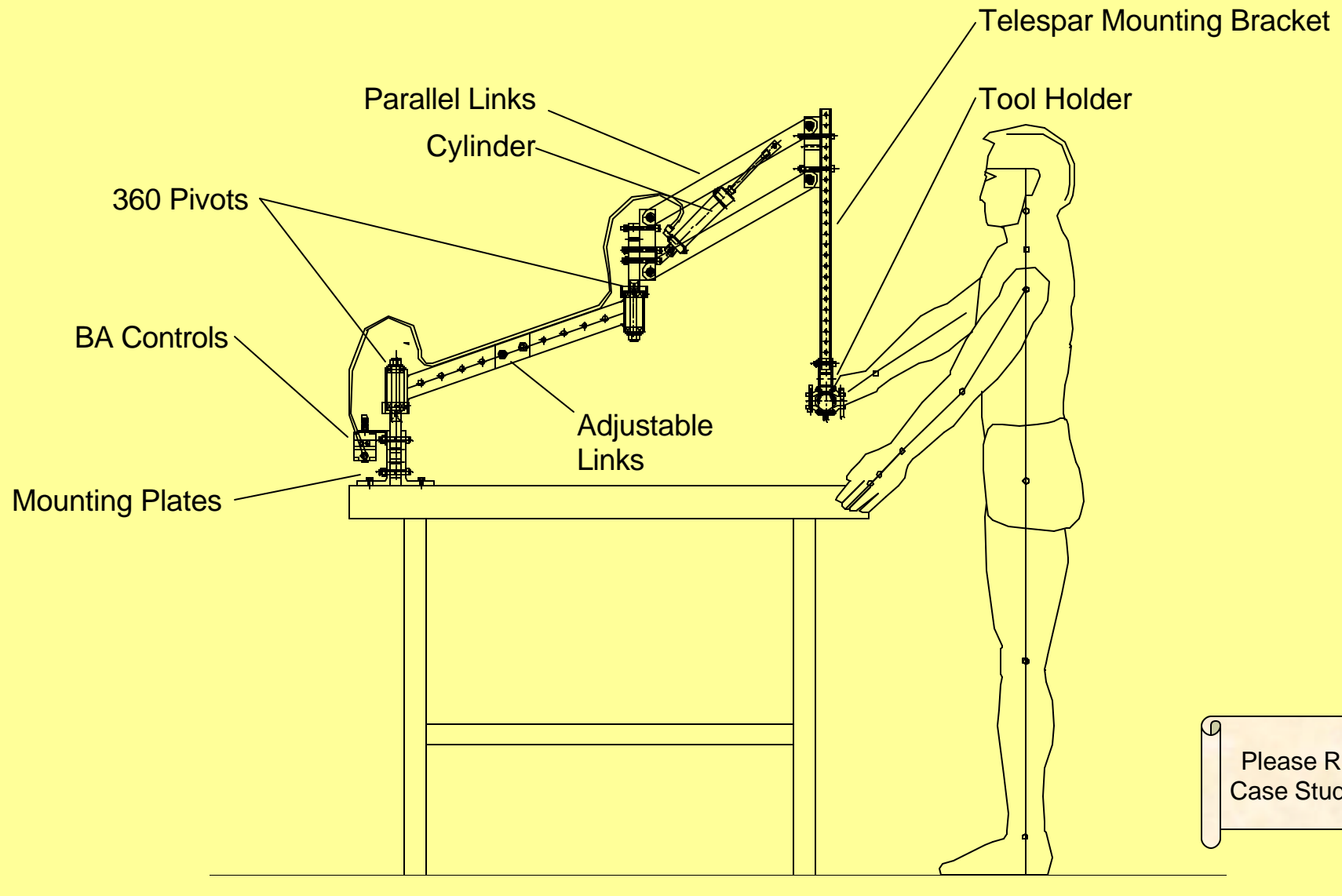


Light Duty Tool Arm



- Covers a work area of 24" wide x 30" long
- 30lb.(13kg) Capacity 20" of vertical travel
- Absorbs 60ft/lb.(81nm) of torque
- Modular design allows a multiple of configurations
- Can mount to ceiling, wall or tabletop
- All metric fasteners for worldwide distribution
- Adjustable springs to return to "home" position
- Anodized aluminum construction

Light Duty Tool Arm Components



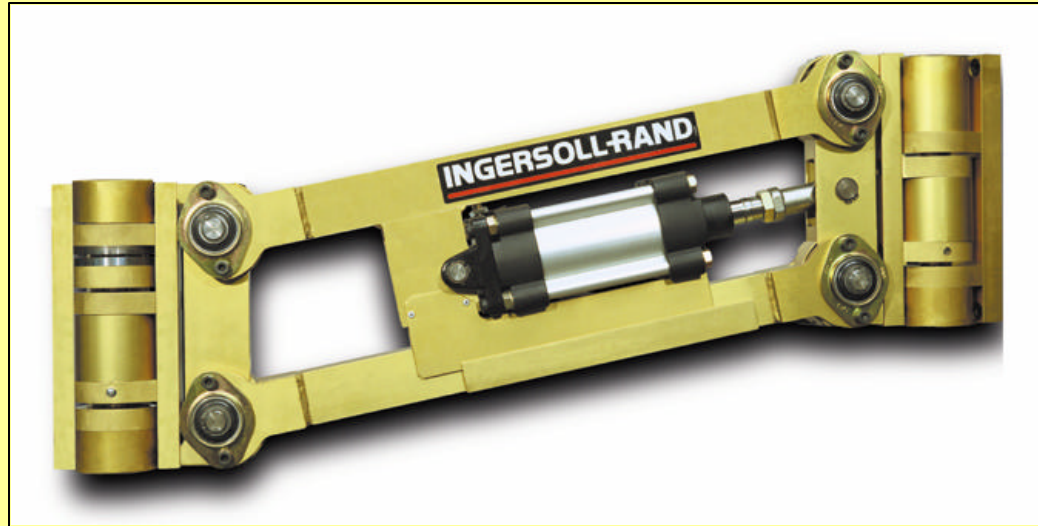
Please Read
Case Study #1



Case Study

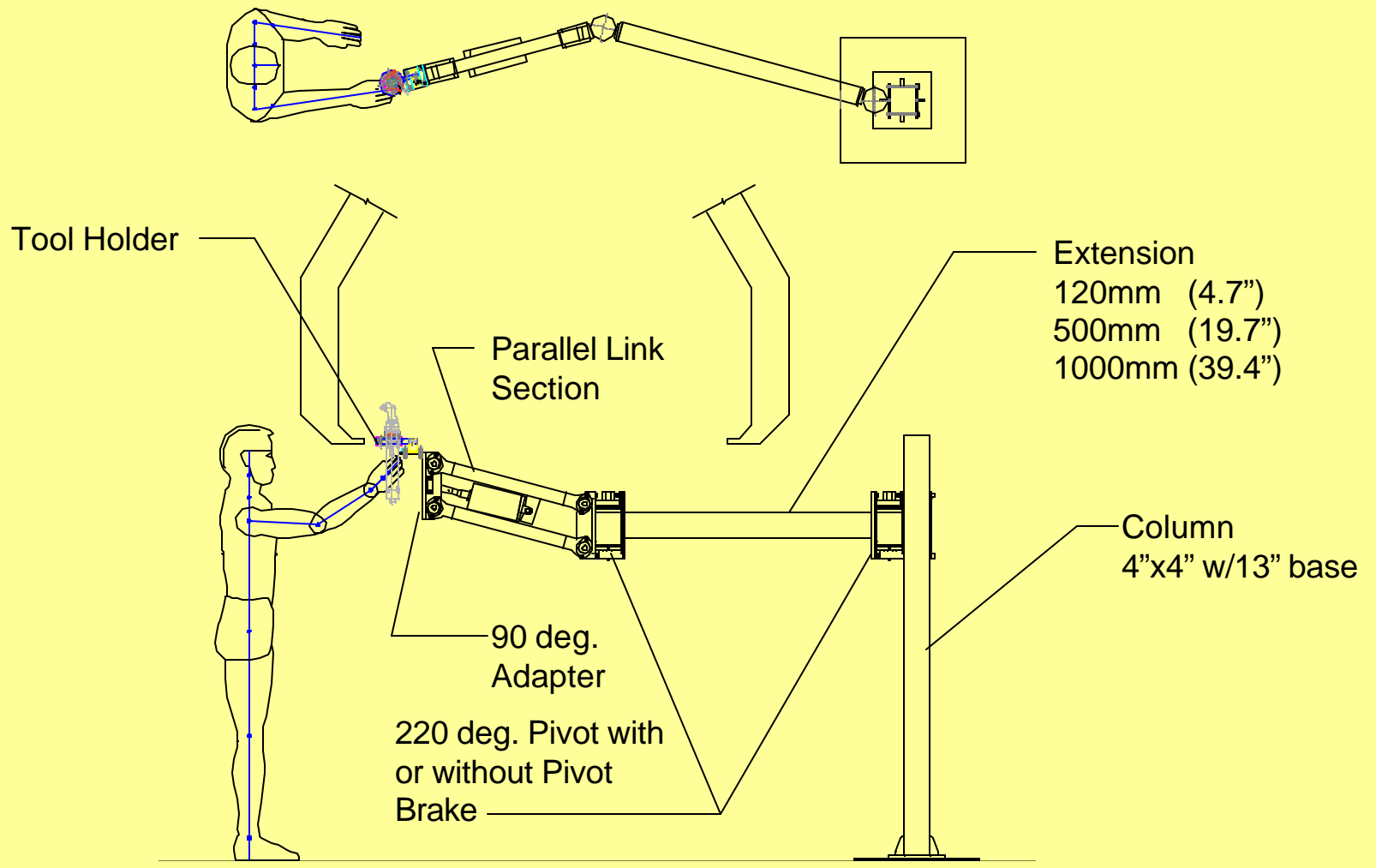
- **Problem:** In one of the big three automotive plants, a 2-3 shift operation fastens parts together with 12 screws per assembly. The equipment they were using to suspend the inline tools was flimsy, not ergonomic, caused undue down time and put the operators safety at risk.
- **Solution:** Zimmerman/IR replaced this equipment with Light Duty Tool Arms. We were then asked to design a special tool holder to meet their specific needs. Zimmerman jumped at the chance to provide the best possible solution to their problem. A new tool holder, which will become a standard, was created and the customer has been up and running for 18 months without incident.

Medium Duty Tool Arm



- Modular Worldwide (Metric) design
- 110ft/lb. (150nm) torque reaction
- 110lb. (50kg) capacity at 6'
- 20" of vertical travel
- Multiple mounting configurations
- Anodized aluminum construction
- Tool holders common to the Torque tube

Medium Duty Tool Arm Layout with Optional Accessories



Exercise

The EZ Torque has **48**" of vertical travel and up to **100** ft/lbs. of torque capacity.

The EZ torque tubes utilize **B** bearings for maintenance free operation.

A) ~~Emulze~~

B) Rulan LR

C) ~~Roller~~

- BA or Balance-Air controls are utilized on what torque reaction products?
- A) EZ Torque and EZ Torque Tubes
 - B) Light Duty Tool Arm
 - C) Medium Duty Tool Arm
 - D) All of the above

The Light Duty Tool Arm has **20**" of vertical travel and up to **60** ft/lbs. or torque reaction.

The Medium Duty Tool Arm has **20**" of vertical travel and up to **110** ft/lbs. or torque reaction.

Application Data for Torque Reaction Products

In determining which product to offer the end user obtain the following data:



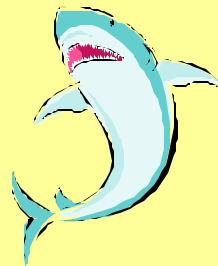
Torque rating of tool



Part Location



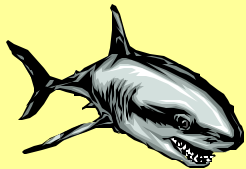
Tool Type



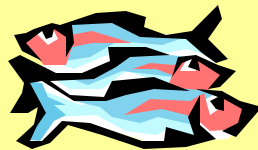
Travel



Mounting Location



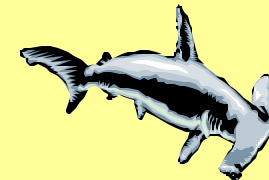
Total weight & overall size



Tool Position

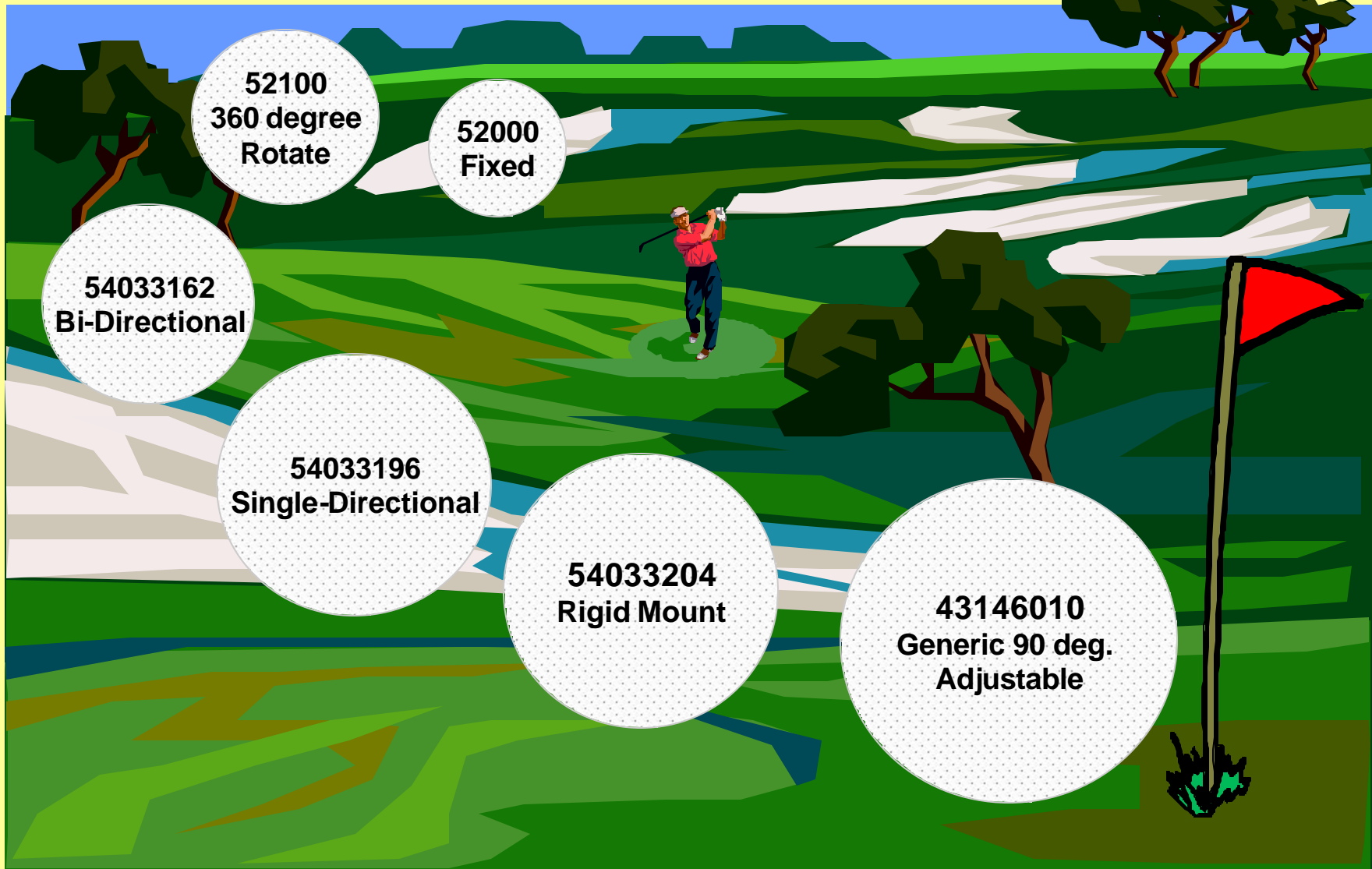


Plant air pressure



Overall Dimensions of Workstation

Standard Tool Holder Products



EZTT & MDTA Standard Tool Holders

52000 - Fixed Tool Holder



- Mounts to the **EZ Torque Tube** and the **Medium Duty Tool Arm**
- 150 Nm torque capacity
- Utilizes clamp castings designed to minimize damage to the tool
- Adjustable to accept up to a 2.50 inch diameter tool
- Adjustable to mount tool vertically or horizontally

52100 - 360° Rotational Tool Holder



- Mounts to the **EZ Torque Tube** and the **Medium Duty Tool Arm**
- 150 Nm torque capacity
- Utilizes clamp castings designed to minimize damage to the tool
- Adjustable to accept up to a 2.50 inch diameter tool
- Bronze bearing design provides 360 degrees of rotation
- Rotation can be locked out at 45 degree intervals
- Adjustable to mount tool vertically or horizontally

LDTA Standard Tool Holders

54033162 - Bi-Directional Tilt Tool Holder

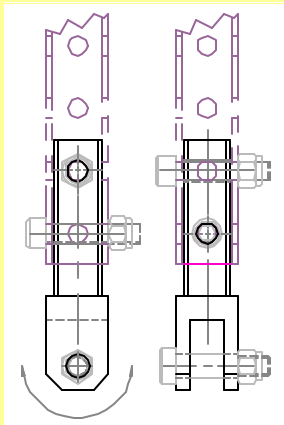


- Mounts to the **Light Duty Tool Arm**
- Designed to mount a DC Push to Start tool vertically
- Allows the tool to be tilted front-to-back and left-to-right
- Robust dual clevis/shoulder bolt design

Quote: “The Bi-directional Tilt tool holder allows us to offer the customer the added benefit of Bi-directional movement thereby optimizing the use of our push to start tool. The steel clevis and shoulder bolt design assures the end user that this tool holder was built to last.”

FTS - Sales

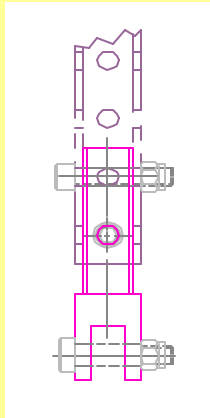
54033196 - Single Directional Tilt Tool Holder



- Mounts to the **Light Duty Tool Arm**
- Designed to mount a DC Push to Start tool vertically
- Allows the tool to be tilted in one direction
- Robust dual clevis/shoulder bolt design

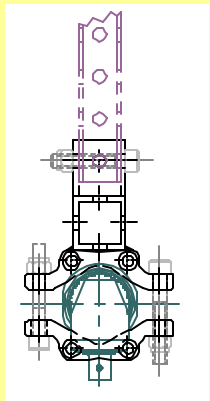
LDTA Standard Tool Holders

54033204 - Rigid Mount Tool Holder



- Mounts to the **Light Duty Tool Arm**
- Designed to mount a DC Push to Start tool vertically
- Rigidly mounts the tool vertically which eliminates movement in all directions
- Robust dual clevis/shoulder bolt design

43146010 - Generic 90 Degree Tool Holder



- Mounts to the **Light Duty Tool Arm**
- Utilizes clamp castings designed to minimize damage to the tool
- Adjustable to accept up to a 2.50 inch diameter tool
- Adjustable to mount tool vertically or horizontally
- Included with the LDTA when ordered under part number EZTA080500

Tool Holder Considerations



Standard product line
has been established



Need to expand product line
to react to customer needs

Please Read
Case Study #2

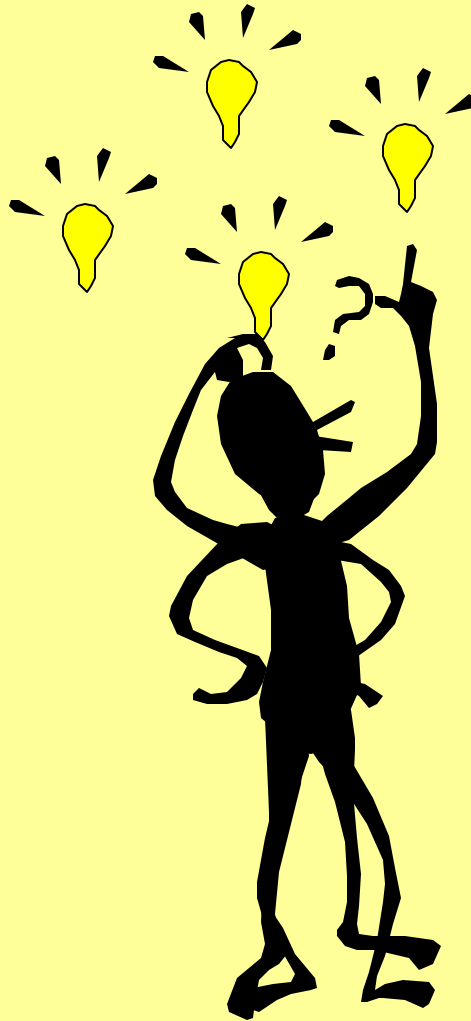
Case Study

- **Problem:** A transmission plant in Ohio was experiencing problems with a particular work cell. The operator's task was to torque 2 bolts on a transmission housing that was located on a belt and roller conveyor. The problem was that not only did he have to hold the tool and absorb the torque, he also had to hold the top of the part with his other hand to stop it from tipping over when the bolt was tightened down.
- **Solution:** Zimmerman/IR provided a column mounted Light Duty Tool Arm to absorb the torque reaction of the tool. The transmission housing was held in place using a clamp fixture mounted to a torque tube. The operator would lower the fixture to the part, whereupon a part present switch would signal the clamp to engage the part and then send a signal to the controller telling the gun it was OK to start. After reaching the required torque, the tool would signal the clamp to disengage and lift up out of the way. The operators fatigue problem was solved, productivity and part reliability improved, and part damage was reduced.

Cross Functional Possibilities

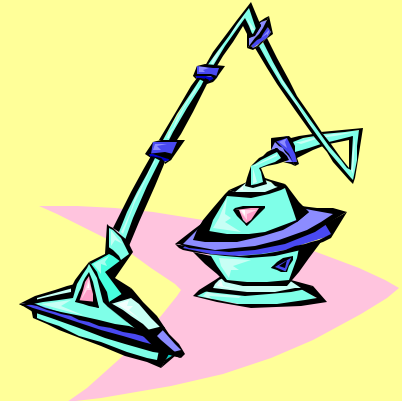


Clamp Devices



INSPECTIONS

Check Fixtures



Vacuum Devices



Assembly Assist

Job Aid

PRODUCT	CAPACITY	TORQUE	TRAVEL	MATERIAL	BEARING TYPE	MOUNTING OPTIONS
EZ TORQUE	2-50 LBS	135 Nm	48"	Aluminum/Steel	Roller	Trolley/Rigid
EZTT	100 LBS	150 Nm	12", 24", 36"	Stainless Steel	Rulan LR	Trolley/Rigid
LDTA	30 LBS	80 Nm	20"	Anodized Aluminum	Roller/Bronze	Universal Mount
MDTA	110LBS	150 Nm	20"	Anodized Aluminum	External Roller	Column, Wall

Module Review

TRUE

1. (T/F) Using a torque reaction product can result in lower worker compensation and healthcare costs.

TRUE

2. (T/F) The EZ Torque was the first product offered in the torque reaction line.

3. The torque reaction product most suitable for a workbench mounted application utilizing a tool rated at 81Nm or less would be the LDTA.

TRUE

4. (T/F) One of the options for the Medium Duty Tool Arm is a standard pivot that provides 220 deg. of rotation.

FALSE

5. (T/F) Capacities are typically listed @ 60 psi.

6. The part number for the tool holder that mounts to a EZTT and provides 360 deg. of rotation is 52100.

FALSE

7. (T/F) The torque reaction product line cannot be used for anything but torque tools.

TRUE

8. (T/F) The MDTA and the EZTT can absorb up to 150Nm.

9. The Abbreviation for Balance Air Controls is BA.