

# Assembly of Material Handling System for Hydraulic Press

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**ABSTRACT:** The objective of this method, all the material handling systems are important in all hydraulic industries. Now a days we using cranes, fork lift, conveyors and industrial trucks. We change this method by using manual handling without any fuel and power. A fixed roller bearing is provided to easy moving for material. It reduces the time and manual power. It reduces the damage of machines and it can be placed accurately without any damages. The maximum number of material handling system is used in all hydraulic industries. But this project can be useful to all hydraulic industries handling time will be reduced when compare to another manual type handling. The cost of this system is low and it is more efficient to the modern world.

**KEYWORDS:** cost, fuel, power, roller

## I. INTRODUCTION

Material handling system are used to handling the heavy weight material and die to the required process place. This system offers greater consistency, productivity, and lower cost when compared to another handling systems.

Material handling (MH) involves “short- distance movement that usually takes place within the confines of industries.” It can be used to create “time and place utility” through the handling, storage, and control of material, as distinct from manufacturing. A common approach to the design of material handling systems (MHs) is to consider material handling as a cost to be minimized.

In this material handling system is mainly depending upon the hydraulic pressing material handling system. In this material handling system is very easy and safety purpose comparing another material handling system. In olden days the handling method is very hard and very high damages in the machine bed and safety is not good.

So we are implemented the “assembly of handling operated material handling system in hydraulic machines” to avoid damages to the machine and safety purpose also.

## OBJECTIVES

- It should be able to determine appropriate distance to be covered.
- Facilitate the reduction in material damage as to improve quality.
- Reducing overall manufacturing time by designing efficient material movement.
- Improve material flow control.

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- Creation and encouragement of safe and hazard-free work condition.
- Improve productivity and efficiency
- Better utilization of time and equipment.

### II. CONSTRUCTION AND EXPLANATION BALL BEARING SETUP

The ball bearing is a type of rolling –element bearing that uses balls to maintain the separation the bearing races. The purpose of a ball bearing is to reduce rotational friction and support radial and axial loads. It achieves this by using at least two races to contain the balls and transmit the loads through the balls.

The most applications, one race is stationary and the other is attached to the moving assembly (e.g., die or material). As one of the bearing races moving it causes the balls to rotate as well. Because the balls are rolling they have a much lower coefficient of friction than if two flat surfaces were sliding against each other.



Fig.1. Bearing Setup

Ball bearings tend to have lower load capacity for their size than other kinds of rolling- element bearings due to the smaller contact area between the balls and races. However, they can tolerate some misalignment of the inner and outer races.

In this system the bearing working is classified in the direction way. They are

- front and back movement setup and
- Left and right movement setup

### III. FRONT AND BACK MOVEMENT SETUP

The up and down movement bearing setup consist of bearing, bearing locker pin, lock plate, roller bracket and screw. The up and down movement bearing setup is shown in fig.



Fig.2. Front and Back Movement Setup of Bearing

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This setup is used to easily the die material move for hydraulic machine bed. In hydraulic machine bed we are inserted the die lifter. It is used to reduce the friction of bed surface and die material and easily handled.

### LEFT AND RIGHT MOVEMENT SETUP

The left and right movement bearing setup consist of bearing, bearing locker pin, roller bracket stand pin and roller bracket. The left and right movement setup is shown in fig.

The setup is used to do not allow the material for handling time for the setup. So the left and right bearing setup is used.



Fig.3. Left and Right Movement Setup of Bearing

### WHEEL SETUP

A wheel is a circular component that is intended to rotate on an axle bearing. Wheel are everywhere in our world today in very obvious places (on cars, trucks, and airplanes), but also hidden inside everything from computer hard-drives and clothes washers to electric toothbrushes and dishwashers. Six thousand years ago, there weren't any wheels at all.



Fig.4. Non Rotating Arm Wheel

Wheels reduce friction. Instead of simply sliding over the ground, the wheels dig in and rotate, turning around sturdy rods called axles. Wheels provide leverage in other words, they are examples of force multipliers or simple machines.

To rotate non-directional tires, use the cross pattern. For cars with rear-wheel drive, move the front tires to the opposite sides of the rear: left-front to right- rear and right-front to left-rear. The rear tires are moved straight forward.



Fig.5. Rotating Arm Wheel

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Front and rear tires were differently. For example, the front tires carry more than 60% of your car's weight consequently, front tires wear down faster than the rear ones. Also, turning wears the front tires at different rates. In America, we generally take left turns faster than we do right turns. This puts more load on the right front tire which results in the right tire wearing faster than you left. After thousands of miles of driving, you end up with uneven tread wear.

In this system two types of wheels are used for moving the bed. They are

- Rotating arm wheel and
- Non rotating arm wheel

### SPRING

springs are flexible machine elements used for controlled application of force (or torque) or for storing and release of mechanical energy. Flexibility (elastic deformation) is enabled due to cleverly geometry or by using of flexible material.

A heavy-duty helical spring designed for compression and tension. A spring is an elastic object used to store mechanical energy. Springs are usually made out of spring steel. There are a large number of spring designs; in everyday usage the term often refers to coil springs.

### IV. TYPES OF MECHANICAL SPRINGS

Types of Mechanical Springs. I know this is elementary stuff for most of you used. The springs are classified form the seven types We are using the Extension Spring on this handling.

#### EXTENSION SPRING

The extension spring stretches apart to create load. They often have little loops on the ends to attach to things. You may find these on the screen door hinge, garage door hinge, and bouncy decorations that hang from the ceiling. The Slinky(tm) is a very weak extension spring. Extension springs, however are different in two ways. Firstly, they are normally close-coiled whereas in compression springs the coils are open.



Fig.6. Extension Spring

Secondly, initial tension can be put into extension springs so that a particular load has to be applied to the spring before the coils begin to open. **HANDLE** A handle is a part of, or attachment to, an object that can be moved or used by hand. The design of each type of handle involves substantial ergonomic issues, even where these are dealt with intuitively or by following tradition. Handles for tools are an important part of their function, enabling the user to exploit the tools to maximum effect. The three nearly universal requirements of are marked

Sufficient strength to support the object, or to otherwise transmit the force involved in the task the handle serves. Sufficient length to permit the hand or hands gripping it to reliably exert that force. Sufficiently small circumference to permit the hand or hands to surround it far enough to grip it as solidly as needed to exert that force.

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### PULL HANDLES

One major category of handles are pull handles, where one or more hands grip the handle or handles, and exert force to shorten the distance between the hands and their corresponding shoulders. The three criteria stated above are universal for pull handles. Many pull handles are for lifting, mostly on objects to be carried.



Fig.7. Pull Handle

### LEVER

A lever is a machine consisting of a beam or rigid rod pivoted at a fixed hinge, or fulcrum. A lever is a rigid body capable of rotating on a point on itself. On the basis of the location of fulcrum, load and effort, the lever is divided into three types. It is one of the six simple machines identified by Renaissance scientists. A lever amplifies an input force to provide a greater output force, which is said to provide leverage. The ratio of the output force to the input force is the mechanical advantage of the lever.

Levers are used to lift heavy weights with the least amount of effort. In the example opposite, the heavy weight on the left hand side is been lifted by the person because of the lever. The longer the 'rod' the easier it is to lift the weight. Under normal circumstances the person would not be able to lift the weight at all. The fulcrum is the place where the rod pivots (or rotates).

There are three types or classes of levers, according to where the load and effort are located with respect to the fulcrum. Class 1 has the fulcrum placed between the effort and load, Class 2 has the load in- between the effort and the fulcrum, and Class 3 has the effort between the load and the fulcrum.

The lever is the most familiar of all the simple machines because of its plain construction and extensive use in numerous engineering devices. It merely consists of a rigid beam or rod which freely rotates about a fixed point, also referred to as the fulcrum. By positioning the fulcrum close to a heavy object and applying an effort from far away, levers can be used to lift enormous loads with ease.

### BRACKET

Bracket for a shelf or hanging items. A bracket is an architectural element: a structural or decorative member. It can be made of wood, stone, plaster, metal, or other mediums. It projects from a wall, usually to carry weight and sometimes to "...strengthen an angle". A corbel and console are types of brackets.

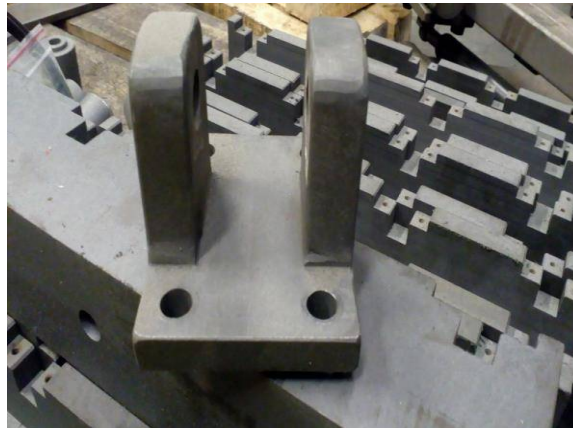


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**Fig.8. Bracket**

Brackets can support many architectural items, including a wall, balcony, parapets, eaves, the spring of an arch, beams, pergola roof, window box, or a shelf.

In adjustable shelving systems, the bracket

may be in two parts, with the load-bearing horizontal support fitting into a wall-mounted slotted vertical metal strip.

Brackets also are an element in the systems used to mount modern facade cladding systems onto the outside of contemporary buildings, as well as interior panels.

### **SENSOR**

A sensor is a device which is capable of converting any physical quantity to be measured into a signal which can be read, displayed, stored or used to control some other quantity. This signal produced by the sensor is equivalent to the quantity to be measured. Sensors are used to measure a particular characteristic of any object or device. We are using proximity sensor for in this handling.

### **PROXIMITY SENSOR**

A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact. Proximity sensors can have a high reliability and long functional life because of the absence of mechanical parts and lack of physical contact between sensor and the sensed object.



**Fig.9. Proximity Sensor**

### **DIE LIFTER**

Die Lifters are used in pairs or sets as per the 'T' slot length in the bolster. Hydraulic piston fitted with needle roller bearing lift the die set allowing the die to be easily rolled in and out during die change process.

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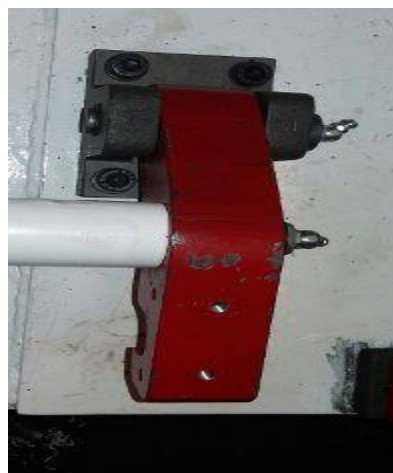


**Fig.10. Die Lifter**

Die lifter is of rectangular cross section & can be fitted in "T" Slot of bolster. In 250 mm & 200 mm length die lifters, four & three single acting, load return cylinders are fitted respectively. Various lengths can be assembled by using combinations of 250 & 200 length die lifters.

### HOOK CLAMP

Hook clamp are typically made of steel or cast iron, though smaller clamps may be made of pot metal. At the top of the "hook" is usually a small flat edge. At the bottom is a threaded hole through which a large threaded screw protrudes. One end of this screw contains a flat edge of similar size to the one at the top of the frame, and the other end usually a small metal bar, perpendicular to the screw itself, which is used to gain leverage when tightening the clamp. using handles. It is only used to handling of hydraulic die material only.



**Fig.11. Hook clamp**

When the clamp is completely closed, the flat end of the screw is in contact with the flat end on the frame. When the clamp is actually used, it is very rare that this occurs. Generally some other object or objects will be contained between the top and bottom flat edges.

### V. WORKING

Tool cart is driven by 2 operators manually. Tool cart brought to rear of the press material. Tool cart is engaged with press through a mechanical hook. It is actuated manually by the operator through handle. The sensor placed in the lock pin, present in press, is sensed by the hook. This will enable the tool change over mode which can be selected through HMI. The hydraulic die lifter is lifted up through the push button in HMI panel. The tool stopper rod is released through the handle manually. The tool is manually pushed inside the press and aligned to press center. After positioning,

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hydraulic die lifter is released down through push button in HMI panel. Bottom wedge clamp and swing bolt are engaged to lock the lower tool. The top bed is moved down manually through "Ram down" push button in HMI panel. Top wedge clamp and swing bolt are engaged to lock the upper tool. The top bed is moved up to home position manually through "Ram up" push button in HMI panel. Tool change mode is changed to cycle mode by the selector switch in HMI panel. Component loaded in the tool. Cycle started through finger touch cycle start button.

### VI. CONCLUSION

This project is mainly useful for the easily handling for the die material in hydraulic industries. In this system is less weight comparing the other systems. It is easily to change the die material without helping of other systems. It is maximum handling weight is 2 ton. In this system does not required power supply. In this system handling safety is high to comparing another systems. It is only operated manual handling

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