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"DYNAMIC ANALYSIS OF DOUBLE TOGGLE SIZE REDUCTION MACHINE"

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ABSTRACT

This Paper depicts the plan as well as investigation of a water powered scissor lift. Traditionally a scissor lift or jack is utilized for lifting a vehicle to change a tire, to get to go to the underside of the vehicle, to lift the body to calculable level, and numerous different applications Also such lifts can be utilized for different purposes like upkeep and numerous material taking care of tasks. It tends to be of mechanical, pneumatic or pressure driven type. This paper is principally centered around force following up on the water driven scissor lift when it is expanded and contracted. By and large, a water driven scissor lift is utilized for lifting and holding significant burden parts. Material determination assumes a vital part in planning a machine and furthermore impact on a few variable, for example, sturdiness, dependability, strength, obstruction which at long last prompts increment the existence of scissor lift.

Key Words: *Hydraulic scissor lift, solid works ,Car lift, strength, material.*

I. INTRODUCTION

Jaw crushers are large size reduction devices, used in mechanical, metallurgical and composite industries. Crushing the process of reducing the size of solid particles into smaller vertical sizes. Based on the machine used are three types of crushers namely Cone crusher, Jaw crusher and Impact crusher.

Fractures occur in feeders where the stress arises from the force exerted by the force, the pressure or the effect of the shave exceeds the threshold for elasticity.Usually crushers are very surprised, large and heavy in their construction. The contact areas are lined with flexible lines made of high-strength manganese or other sheet metal alloy with a flat or bonded surface. Shearing pins or nest on heavy folded springs are provided in the crusher to monitor shock and load loads.

The crusher can be considered as a base, second or cone crusher depending on the size reduction factor.

a) Basic crusher - The raw material from the mines is first processed in the basic crushers.

The input of such crushers is relatively wide and the output products have a wide range of sizes. Example - Jaw crusher, Gyratory crusher.

b) Second Crusher - Grinded stones from the crusher are sent to the second crusher to reduce the size.

Example - Cone crusher, gyratory reduction crusher, spring rolls, disk crushers etc.

c) Fine Crushers - Fine crushers have small holes, and are used to crush the feed into a uniform and better product.

Example - Gravity stamp.

The crushed material is lowered between two solid pieces of metal, one of which then slides inward toward the rock, and the rock is crushed as it has a lower fracture point than the opposing metal piece. The movement of the jaw crusher is directed around one side of the moving jaw. As well as the eccentric movement found at the opposite end.

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The size of the jaw crusher is determined by the rectangular or square opening of the jaw .For example, 22 x 30 grinding jaws have a 22 "by 30" hole, a 46 x 46 jaw crusher with a 46 "square opening.

Normal jaw crushers usually have a square opening design, and second jaw crushers have a rectangular opening design. Jaw crushers are used as basic crushers in a mine or in a metal processing plant or the first step in the stone reduction process. They follow the "crush using pressure" method.

1.2 Different Types of Jaw Crusher:

According to the amplitude of moving facial expressions; The jaw crusher is classified as follows.

A) - Blake Type Jaw Crusher:

Blake type jaw crusher, basic crushers in the mineral industry; reaches maximum amplitude under crushing jaws as the moving jaw leans against the top of the frame. These crushers are operated and controlled by pitman and toggle. The feed opening is called a gape and the opening at the end of the release is called a set. Blake crushers may have one or two variables. A toggle is used to direct a moving jaw. Jaw movement from its depth of travel is carried out by seedlings of small crushers or by pitman of large crushers. During the reversal act, when the jawbone moves from the unbroken jaw the particles of the broken stone slide down and are caught again in the next pitman movement and are crushed and even smaller. This process continued until the particle size became smaller than set; a small hole at the bottom. For smooth movement of the jawbone, heavy flywheels are used.

II. MODELING

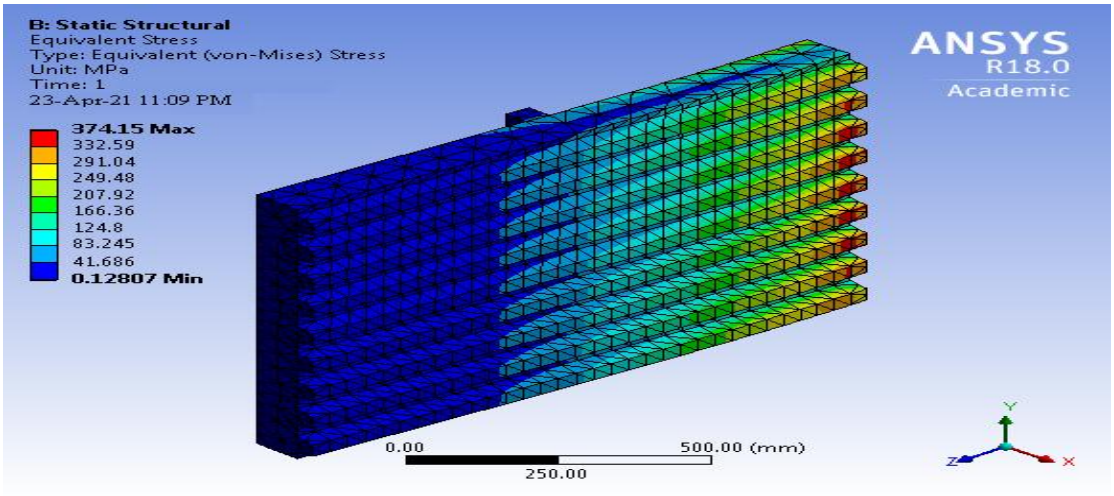

Fig.2.1 One stiffner jaw plate stresses results

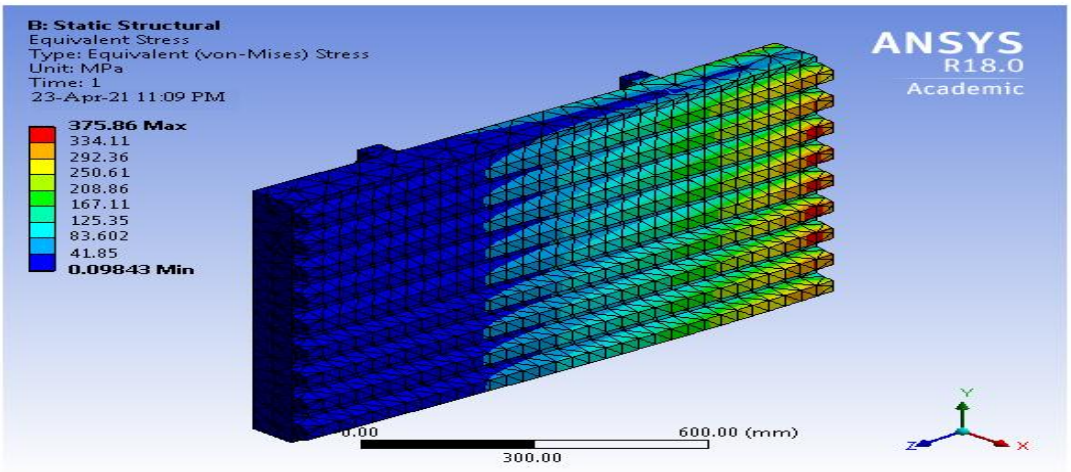

Fig.2.2 Two stiffner jaw plate stresses results

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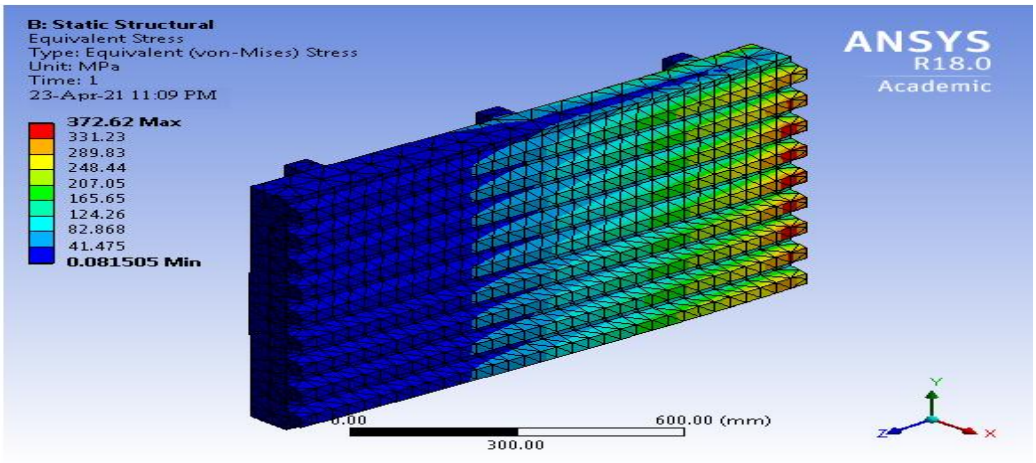

Fig.2.3 Three stiffner jaw plate stresses results

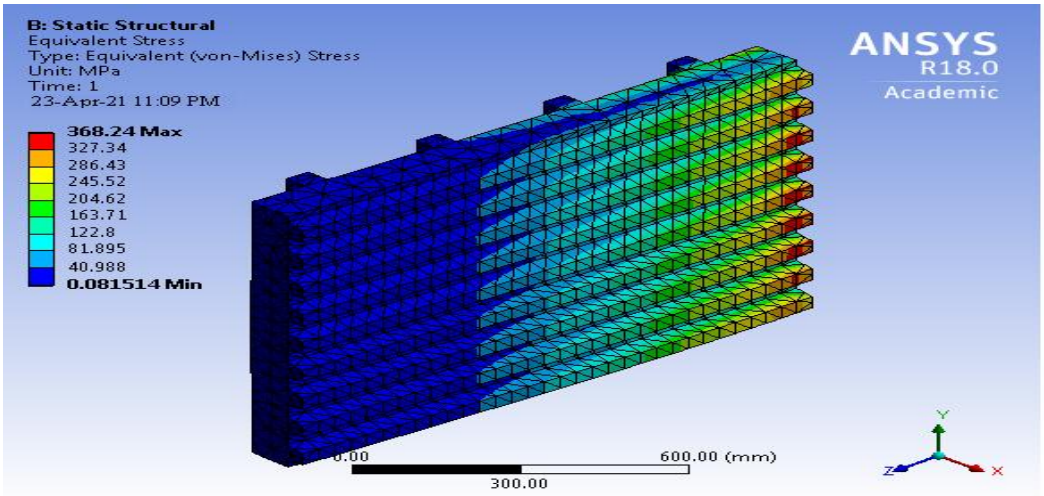

Fig.2.4 Four stiffner jaw plate stresses results

Plate thickness 140mm deformation results

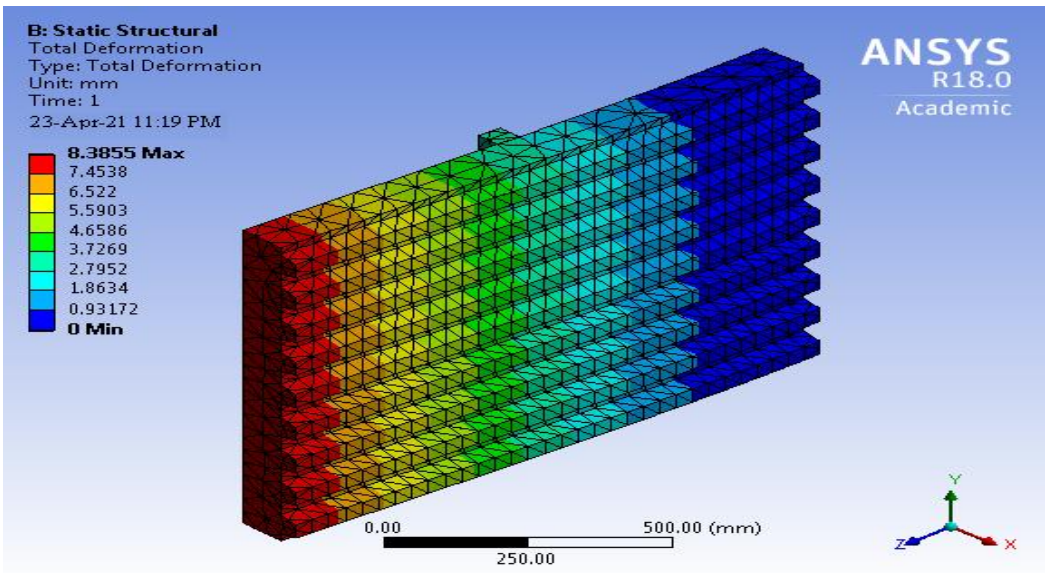

Fig.2.5 One stiffner jaw plate deformation results

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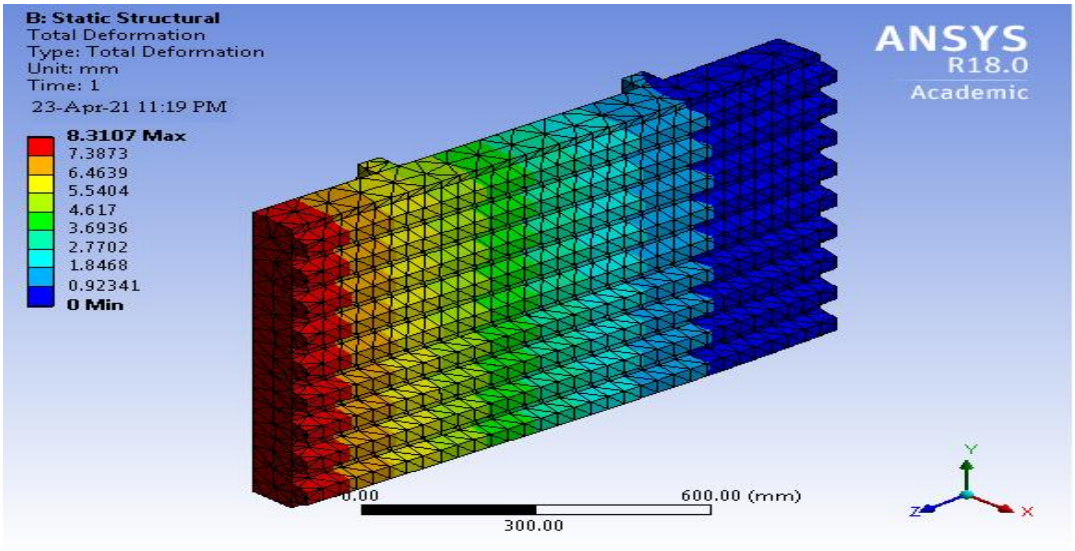

Fig.2.6 Two stiffner jaw plate deformation results

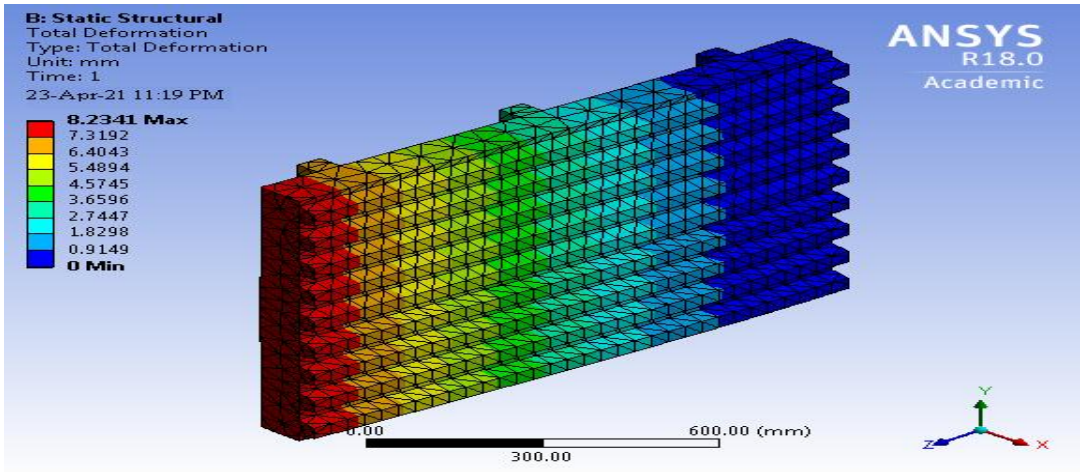

Fig.2.7 Two stiffner jaw plate deformation results

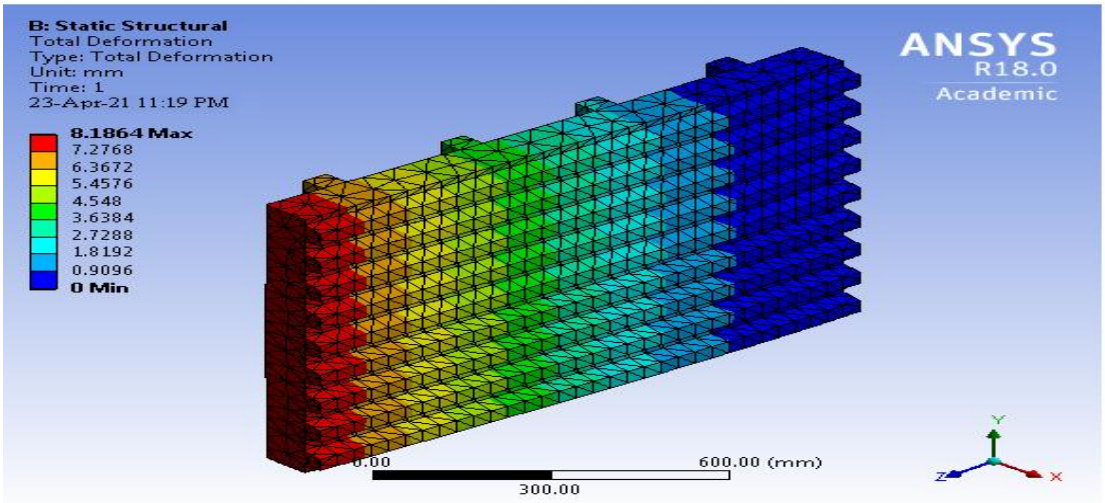

Fig.2.8 Four stiffner jaw plate deformation results

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III. RESULTS & DISCUSSION

Table 3.1 overall results **3.1 Discussion over the results of Stress results produced as a Result of Analysis**

Here double toggle crusher dynamic simulation performs on ANSYS software platform. Here four types jaw plates used with different stiffener like one, two three and four stiffener plates and dynamic simulation performed on Creo-e 3.0 software. So through FEA simulation on jaw plates here find out stresses and deformation results on plates.

3.2: - Discussion over the results of FEM Results of Displacement in the Swing Jaw

The Result window below shows the results of Displacement occurred in the swing jaw at the moment it strikes the stone.

After FEA simulation all four geometry of stiffener jaw plates find out stresses results are respectively 374.15 MPa, 375.86 MPa, 372.62MPa and 368.24 MPa and Deformation results are 8.38 mm, 8.31 mm, 8.23 mm and 8.18 mm are in acceptable range and thus the swing jaw is safe for the fatigue life of operation of the swing jaw while in operation. This compression chart is shown above figure 46"*30" series double toggle jaw crusher stones crushing rate is vary 60 to 84 t/h for 25 to 38 mm product size, when feed size is take 28" inches. Green line is shown in this chart very high stone crushing rate compare to another double toggle jaw crusher series.

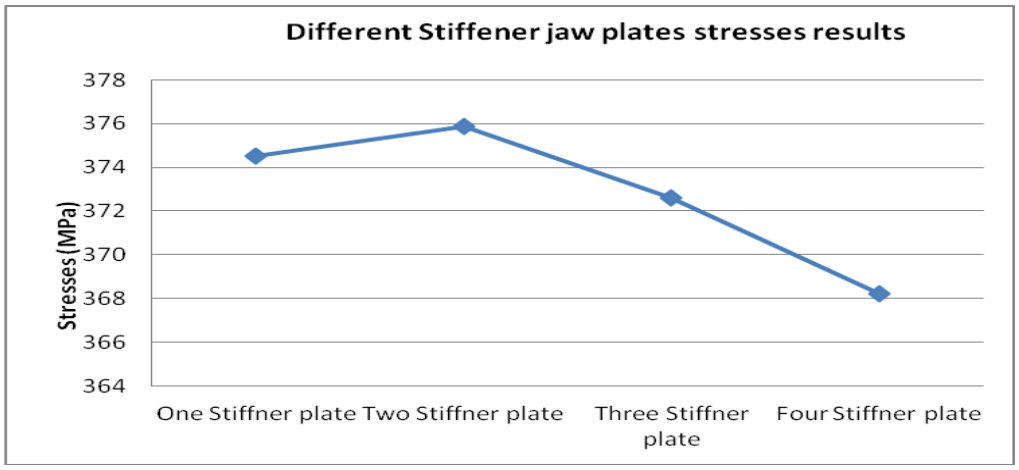

Fig.3.1 Different Stiffener jaw plates stresses results

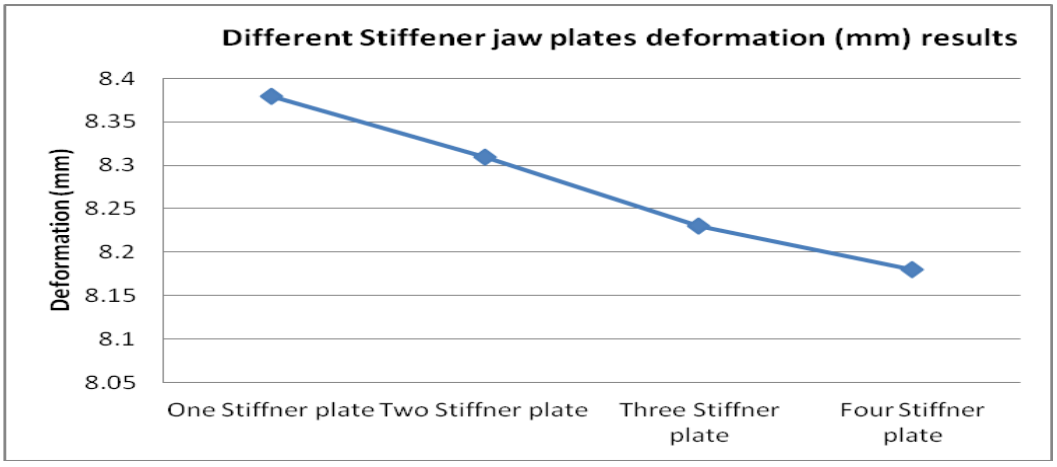

Fig.3.2 Different Stiffener jaw plates deformation (mm) results

So its cleared that four stiffener jaw plates strength is good and deformation less so this design can be used in future.

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IV. CONCLUSION

The machine is optimized for jaw plate, although the casting cannot be changed with fabrication unit under these stresses. Through the application Pro/E platform on the jaw crusher, not only the result of the assembly can be expressed in the form of animation, but also can be output in the form of parameters. Thus, it is easy to know that whether to produce interference between the parts. It makes the original motion relationships in the 2D view are difficult to be expressed become intuitive and easy to modify. At the same time, the development cycle of the jaw Crusher can be shortened and the design process of the mechanism can be simplified. And it is an important means of the modern product design. .With the results obtained from the **Finite Element Analysis** are very safe as per the stress values and the deflections.

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