DESIGN AND FABRICATION OF HEAVY LOAD MOVING SKATES

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Cranes, Forklift, Pallet trucks, Pipes, Crow bars, rollers, handle, side plates, swivel top.

INTRODUCTION:
Engineers often come across the development of an industrial park or construction sites on large scale basis; during such stages there is always a need of a system that can safely transport the huge machineries and structures to its respective site of installation such as during the installation of heavy machineries to a newly constructed plant or for moving different kinds of heavy machines during the time of renovation of the plant. Similar applications can be found at the site of constructions and engineering colleges where setting up of workshops and machine shops become a tedious task during the installation of new equipments.

Those huge machines and equipments on which huge investments are made needs utmost care. Presently cranes, forklifts, pallet trucks and pipes & crow bars are being used while moving those heavy machineries.

While using the above mentioned systems there is always a possibility of experiencing unnecessary swaying of machines owing to its weight, then there is a chance of breakage of ropes due to stress applied on them and also it costs lakhs of rupees to have such an equipment for lifting and transporting.

Among the above mentioned methods for moving heavy loads, widely used and economical method being pipes and crow bars has its own set of disadvantages which are; it generally requires huge man power depending on the type and size of the object being moved. It also requires immense physical strength in order to move objects over pipes. The prolonged adaption of such methods can lead to adverse health effects on the laborers being involved.

To avoid the above mentioned problems, Heavy load moving skates can be substituted in place of conventional methods, which can be effectively used for safe and secure movement of the machineries with minimum risk.

OBJECTIVE:
To design and fabricate/manufacture Heavy load moving skates which can move up to 4 tons of load on its back with easy manual pull.
METHODOLOGY:
The first step in this project is to select the load to be carried on the 4 individual rollers (which are to be used in combination) that we are designing.

1. Designing: Based on the load to be carried, the dimensions of the system like body length, height, roller diameter, width etc are calculated. Also the swivel top and the 2 handles are also designed in this stage. This stage also includes selection of material. So the selected material should be capable of bearing the load without undergoing any kind of fracture or deformation. Another important factor to be considered during the selection of material is its availability and cost incurred during the fabrication. The entire system should be economically viable.

2. After the changes are made, the quantity of material required is approximated and procured through local vendors. Then both the design drawings and the materials are shared with the nearby workshops for fabrication. After all the parts are machined, they are assembled to make it a complete system.

RESULTS AND DISCUSSIONS
TRIAL RUN - 1: Upon testing the skates for a load of approximately up to 0.5 tons, it was possible to move the load easily through manual pull by two people on quite a rough and uneven surface in a workshop. But at times the contact between the skates and legs of the table used to get lost because of the very high unevenness of the surface.

TRIAL RUN - 2: To overcome the discrepancies from the first trial run, the skates were made to run on the college shop floor which was relatively even than that of the previous surface.

   After this run, it was understood that even a small flatness error (unevenness) in the surface, the contact between them used to get lost in longer runs.

   To overcome this error, the top circular plate was Rubber padded; so that the compression and decompression of the rubber pad can compensate to the small unevenness of the surface and even provides cushioning effect for the load.

TRIAL RUN - 3: Since the top surface was rubber padded and it compensated for the unevenness of the floor, the skates moved the above mentioned weight on a flat surface without any hassles with the help of only two people and very minimal force.

CONCLUSION:
The aim of developing a system that can reduce effort, cost, time and difficulty in moving heavy loads has been achieved and this system has at most potential to cater to limitations of most of the conventional systems to move heavy load.

SCOPE FOR FUTURE WORK:
After the completion of this project although there are lot of applications, there is scope for improvement in some of the areas; such as,

1. Circular plate at the top can be magnetized in order to hold metallic components that are loaded in a fixed position.

2. Instead of using two handles to pull the skates, they can be combined with a detachable and telescopic type handles; so that the skates can be single headedly pulled with a single and even force.

3. The slot into which the handle bar fits can be slotted at an angle for proper locking of the handle bar. Improvements can be made for moving load on the skates on uneven surface and on inclined surface with the help of a pivoted swivel top assembly or any other mechanism.