

A Project Report on
“DESIGN AND FABRICATION OF AN EXOSKELETON FOR
HUMAN PERFORMANCE AUGMENTATION”

(Approved by KSCST)

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ABSTRACT

An exoskeleton is an external structural mechanism with joints and links corresponding to those of the human body. Exoskeleton robotic system is a feasible solution that can help people with locomotion difficulties walk again. This system equipped around the human body can support the load and a part of the body weight, enlarging the load bearing capacity and endurance of the biological system. The exoskeleton system basic needs are continuous power supply, simple kinetic energy transmission, degree of freedom of motions.

The exoskeleton component design is based on the kinematics and kinetics of human walking. It is demonstrated that the exoskeleton does transfer loads to the ground with a 90% and higher load transfer depending on the phase of walking. Further, exoskeleton wearers report that the exoskeleton greatly reduces the stress on the shoulders and back. However, although a significant fraction of the payload is transferred through the exoskeleton structure, the exoskeleton is found to increase metabolic economy by 74%. They are oriented into different usages – both military and medical purposes.

The product of this project can become a basis for future exoskeleton controller designs, where it can make a significant impact on almost everyone especially in industry and research. Based on existing designs and technologies studied, a lightweight, portable and easy-to-wear exoskeleton can be constructed.