



Progressive Education Society's
MODERN COLLEGE OF ENGINEERING
Shivajinagar Pune-411005
Department of Mechanical Engineering

A Project Synopsis on
‘DESIGN AND DEVELOPMENT OF FLOATING BACKPACK ’

SUBMITTED BY

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PROJECT GUIDE

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1. TITLE OF THE PROJECT:

‘DESIGN AND DEVELOPMENT OF FLOATING BACKPACK ’

2. INTRODUCTION OF THE TOPIC:

In Indian army, load carriage is an unavoidable part of field operations which is the reason why soldiers often make use of a military backpack. The members of the military forces constantly need to transport supplies, equipment, personal items, ammunition and clothing in training or field operations. Infantry soldiers usually carry loads weighing more than 30% of their body weight. This is an inevitable part of the everyday life of military troops. When the soldier carries a certain weight, his energy expenditure increases, which causes a reduction in performance.

The magnitude of the load generated by the weight carried by soldiers in their backpacks is significant. The ground reaction forces increase as the weight of the carried load increases



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3. LITERATURE REVIEW:

Sr. No	Name of the Authors	Title of the Paper/Book	Findings
1.	Laurence C Rome, Andy L Ruina	Suspended load Ergonomic backpack	<ol style="list-style-type: none">1. It shows a suspended-load ergonomic-backpack has been developed that dramatically reduces the dynamic forces on the body.2. The suspended-load ergonomic backpack of the invention can be used to transport loads more quickly and more comfortably at running speeds in contrast with a conventional backpack where running with a heavy load is essentially impossible.
2.	Joseph J Knapik , Katy L Reynolds, Everett Harman	Soldier Load Carriage: Historical, Physiological, Biomechanical, and Medical Aspects	<ol style="list-style-type: none">1. It is reviewed historical aspects of soldier load carriage. Before the 18th century, foot soldiers seldom carried more than 15 kg while on the march, but loads have progressively risen since then.2. It is desirable to reduce load-carriage related injuries that impair performance, cause discomfort and disability and result in a loss of manpower



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3.	Camilo Eduardo Pérez-Cualtán , Oscar Iván Campo-Salazar	Design of a load carriage system oriented to reduce acceleration forces when carrying a backpack	<ol style="list-style-type: none">1. The prototype is able to reduce the vertical excursion of the load while walking as well as the maximum reaction force generated by the action of the load on the carrier.2. A low damping factor can completely decouple the vertical movement of the load from the vertical movement of the COM of a walking person.3. In conclusion, the device can help with load carriage, by decreasing the maximum reaction forces.
4.	Renee L. Attwells , Stewart A. Birrell, Robin H. Hooper, Neil J. Mansfield	Influence of carrying heavy loads on soldiers' posture, movements and gait	<ol style="list-style-type: none">1. This study examines changes in gait and posture caused by increasing load carriage in military LCS.2. It is concluded that the head functions in concert with the trunk to counterbalance load. The higher muscular tensions necessary to sustain these changes have been associated with injury, muscle strain and joint problems.

4. PROBLEM DEFINATION:

Damage to muscle and the Skelton is the frequent consequence of carrying heavy backpacks and occupational gear on our backs. It also damages the nerves that travel through neck and shoulders, it causes major damages, change in posture when carrying heavy load, Heavy load, causes red marks on the shoulders.



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5. OBJECTIVES OF THE PROJECTS:

1. To develop a load carriage system that minimize the Shocks.
2. To reduce its vertical displacement and movemen.
3. To minimize injuries, which are caused because of carrying heavy load.

6. EXPECTED OUTCOME:

- By using this mechanism we can reduce dynamic forces which act on body during running and walking.
- This mechanism reduces chances of injury from to much strain on back, neck and knees.
- It helps in long marches with less stress on body, also reducing chances of injury from too much strain on back, neck or knees.
- In future this can further be enhanced to small scale electricity generation and casualty evacuation.



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7. MONTH WISE PLAN OF ACTION:

