



Mahatma Gandhi Mission's College  
of Engineering & Technology

# FABRICATION OF FREEDOM TRIKE

*Students name: Kartik Jain, Amit Kumar, Praful Raj Patel, Akshay Khanna*  
*Department of Mechanical Engineering*



## Introduction

A Freedom trike is a human-powered three-wheeled vehicle. It is designed to handle a wider variety of terrain than most other vehicles. In order to fit in well with the end user's lifestyle, it is designed for combined practicality and off road capability.

Lever used, provides more leverage which reduces the effort applied by the user. Heart rate sensors used for limiting the over exertion of the user which is operated by solar panels for more efficiency.

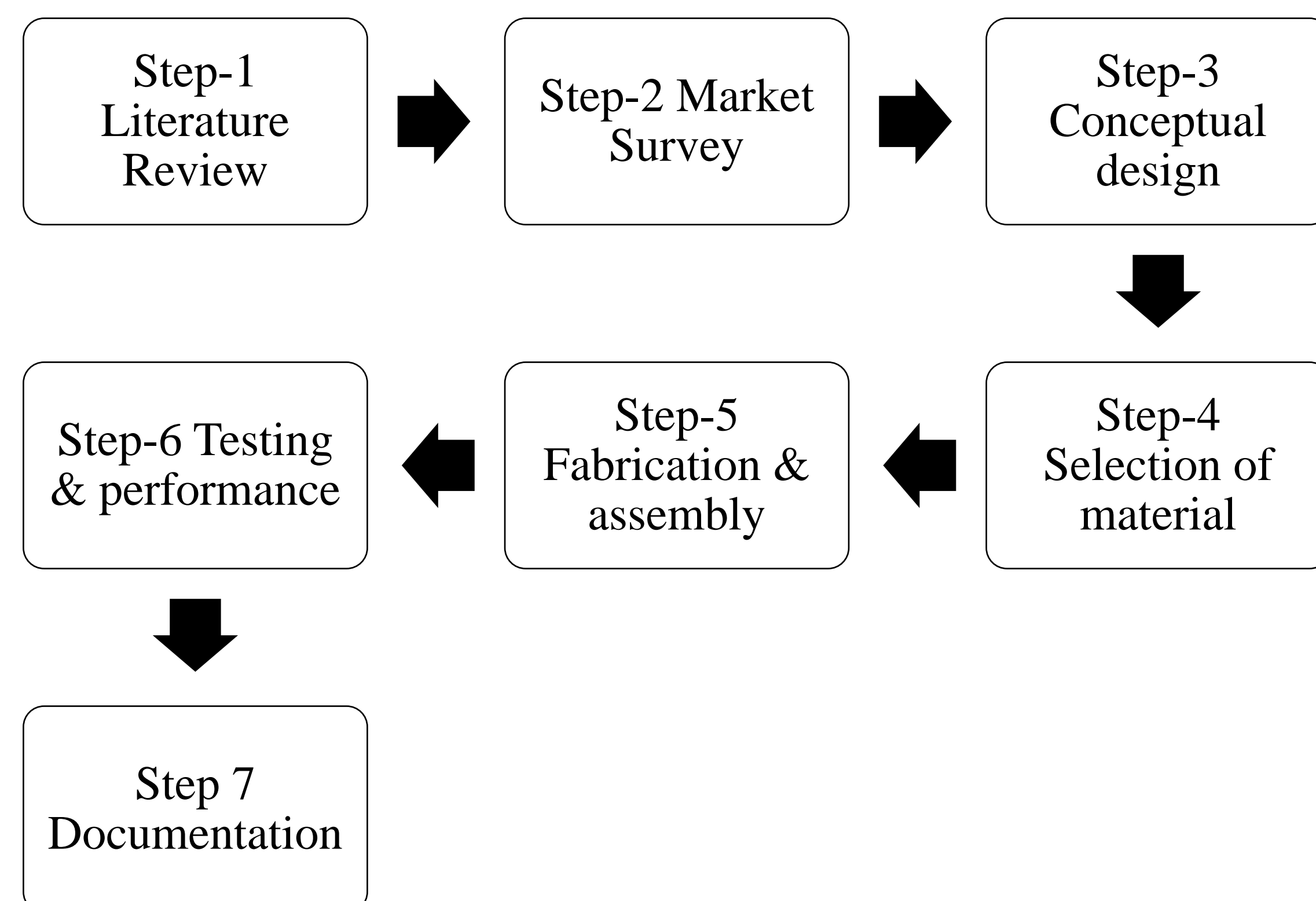
Trikes are intended for use by a single operator, although some companies have developed trikes intended for use by the operator and one passenger.

## Project Objectives

In response to the need of a cost effective and reliable trike for the masses:

- To design chassis & frame for Freedom Trike.
- To maintain proper wheel alignment.
- To reduce the overall weight of trike.
- To reduce effort by the user.
- Fabrication of lever driven trike.
- Monitoring heart rate to determine the condition of the heart of user.

## Methodology



## Results and Discussion

- **Propulsion Test:** To evaluate the mobility of manual trike in 6 minutes.
- **Steering Test:** Steering system work properly (both the front wheel and lever steering) at moderate speeds.
- **Brake Test:** Proper locking of the tyres (both rear wheels) when applying brakes.
- **WTORS Test:** Wheelchair Tie-Down & Occupant Restraint Systems requirements.

## Design Parameters

S.no	Vehicle Specifications	Targets	Achieved
1	Wheel base	At least 22 inches	--"
2	Seat Width	Max 20" at its widest point.	19"
3	Overall Width	Must be At least 80% of wheel base.	31"
4	Seat Depth	Maximum 20" possible.	16"
5	Bucket Angle	Upto 100° (not below 70°)	82°
6	Ground clearance	Minimum 7 inches	8"
7	Lateral Acceleration	Should not exceed 0.4 g	(To be calculated)
8	Brake type	Two Single pivot side-pull caliper brake	2 single caliper brakes used.
9	Wheel Diameter	Front wheel of maximum 10". Rear wheels of maximum 26"	Front wheel = 8" Rear Wheels = 24"
10	Solar panel	Upto 10W	3 Watt

## Images



## Conclusions

- In the fabrication of Freedom Trike first of all we have successfully designed our frame and after that we have done mathematical analysis of our model.
- Fabrication of the lever drive system which is also a challenging one so we have completed in specified time limit.
- We have successfully evaluate the mobility of manual trike in 6 minutes.

## References

1. Jesse Leaman, and Hung M "Review of Smart Wheelchairs: Past, Present and Future"2017. IEEE Int. Conf. Rehabil. Robot., pages 743–748, Kyoto Japan, Jun. 2017.
2. Sharon Eve Sonenblum, Stephen Sprigle "Manual Wheelchair Use: Bouts of Mobility in Everyday Life". Volume 2012, Article ID 753165, 7 pages 2012.
3. Félix Chénier "Effect of Wheelchair Frame Material on Users' Mechanical Workand Transmitted Vibration", Article ID 609369, 12 pages Volume 2014.

**GUIDED BY : MR. UMESH YADAV**  
**ASSISTANT PROFESSOR**  
**(DEPT.OF MECHANICAL ENGINEERING)**