Conceptual Design of Two Wheeler Parking System for Urban Areas

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Abstract:

At recent times, due to rapid increase in the number of two-wheelers in India, the problem of parking becomes more acute day by day. There is a shortage of parking facilities at shopping centers, public places and office complexes. Indian metro cities are feeling the effects of steep vehicular growth. There is a need for an advanced parking management system utilising the available space considering the factors like crowd, location and lesser parking time for two-wheelers. In this project, an effort has been made to give the parking solution with a conceptual design.

In this project work, conceptual design of an efficient two wheeler parking system has been carried out. Initially, GEMBA study was carried out to understand the requirement of public for parking vehicles in city areas and concepts involved in existing parking solutions. Quality Function Deployment (QFD) and Product Design Specifications (PDS) were generated based on GEMBA study. Different concept sketches were generated based on the information obtained from the GEMBA study incorporating the necessary mechanisms and considering space availability. A multi-level vertical parking solution was selected from weighted ranking method. It is a simple mechanism which consists of a rack and pinion arrangement for in and out of parking pallet and chain drive for up and down movement of vehicles. A detailed design was created for the selected concept using UG NX software. Kinematic simulation was carried out to verify the functionality of the parking mechanism. A scaled mock-up model was built with all features as per the detailed design to demonstrate the functionality of the parking system.

A multilevel vertical parking system is one of the potential solutions for two wheeler parking in areas like shopping centres, railway stations, hospitals, educational institutions etc. It accommodates 50% more number of two-wheelers compared to ground parking for the same floor area.

Concept sketch of two wheeler parking system
Geometric model of two wheeler parking system
Kinematic simulation
Ergonomic study
Mock-up model