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### Fabrication of Cargocycle: The Ultimate Bicycle Redesign for Extra Luggage

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ARTICLEINFO	ABSTRACT
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The redesign of traditional bicycles for enhanced cargo-carrying capacity addresses the growing need for sustainable, efficient, and practical transportation solutions. Cargo Cycle ensures a smooth and stable riding experience. Whether for urban commuters, or delivery professionals, this innovative bike offers a reliable and efficient way to transport extra luggage, Cargo Cycle not only enhances transportation efficiency but also supports a cleaner, greener future for urban and rural mobility. This research paper explores the design considerations required to integrate cargo space into the traditional bicycle without compromising the bike's performance, stability, and overall functionality. By focusing on the reediting or redesigning of the older bicycle frame, this paper aims to provide innovative solutions for adding cargo capacity that improves the bike's load-bearing ability, maneuverability, and rider comfort. **Keywords:** Cargo Cycle, folding frame, Redesigning

#### INTRODUCTION

Bicycle is a two wheel vehicle, which is being powered by a rider and can be steered using Handle. It is one of the most eco-friendlier and an economical mode of transport word wide There were various forms of bicycle in the past history through which the existing form has evolved. studies are still going on for making bicycling more comfortable and economical [1]. The growth of cities and the need for eco-friendly transportation have made it essential to rethink how we move around. Bicycles, known for simple, environmentally friendly, being and affordable, have become an important part of getting

around in cities. Enhanced cycling could prevent non-communicable diseases and Decrease mortality [2,3]. when accounting for inhaled air pollution and traffic accidents, the health benefits for Individuals shifting from car to bike substantially outweigh the risks. Cycling for daily transport is taken up by people across all economic sections and all age groups [4], with large societal benefits as well [5, 6]. It has been observed that the courier delivery service boys usually have a heavy bag packs on their scooter or bike which can slide to one side or the other which may result in accident. Also the heavy bag packs cause shoulder fatigue and the delivery boys generally

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have to pay for the fuel expenses. That, in turn, can exacerbate any discomfort you may have or may develop in the future that includes ass pain, back pain and arm and hand pain. So, in order to overcome such problems a new foldable carriage bicycle may be used for easy transport of goods[7]. Cargo bikes are emission-free, environmentally friendly vehicles [8]. Furthermore, they constitute a viable means of Transport in urban delivery systems [9] and can cut costs of delivery [10]. Their logistical benefit arises from the Potential to reduce driving time over short distances in dense urban settings, especially with higher levels of Congestion [11]..

With the increasing popularity of urban commuting, delivery services, and cargo cycling, there is a growing demand for bicycles capable of efficiently carrying extra luggage. To address this need, this study focuses on redesigning existing bicycle models by integrating cargo space. The goal is to enhance the bike's load-carrying capacity without compromising its balance, stability, and ease of use. By re-editing and upgrading older bicycle designs, it is possible to create an efficient cargo bike suited for the modern urban landscape.

In a world where mobility and efficiency go hand in hand, CargoCycle redefines the way we transport goods on two wheels. Designed for urban commuters and delivery professionals, this innovative bicycle seamlessly blends functionality, stability, and extra without compromising storage capacity on performance. with an ergonomic frame, reinforced cargo racks, and a smooth-riding design, CargoCycle allows you to haul groceries, or heavy loads with ease. Whether you're navigating city streets or cruising through long-distance trails, this smart cycling solution ensures a balanced, effortless ride while reducing reliance on motorized transport.

#### PROBLEM STATEMENT

Traditional bicycles are not built to carry extra luggage easily. When too much weight is added, the bike can become unstable, harder to steer, and uncomfortable to ride. The extra load puts strain on the bike's frame and tires, making it less safe and more difficult to control, especially on uneven roads or during turns. Since most bicycles don't have builtin cargo support, riders often use backpacks or unsteady attachments, which can be inconvenient and uncomfortable. This makes carrying goods challenging for commuters, delivery workers, and cargo cyclists. A better-designed bicycle with stronger support and improved balance is needed to make carrying extra luggage safer, easier, and more efficient. A well-designed cargo bicycle can help reduce traffic congestion, air pollution, and carbon footprints by offering a sustainable, eco-friendly alternative for transporting goods efficiently.

# DESIGN CONSIDERATIONS FOR CARGO- SPACE INTEGRATION:

#### Cargo Space and Storage Solutions

The primary function of the redesign is to provide adequate cargo capacity. By adding modular, adjustable cargo systems, the bike becomes versatile and adaptable to various transportation needs, from grocery shopping to professional deliveries. The design of removable rear racks ensures ease of use, while maintaining the balance and maneuverability of the bike.

#### Weight Distribution and Stability

Adding extra cargo can alter the balance of the bicycle, especially in terms of handling and rider comfort. A key consideration in the redesign is to maintain a low center of gravity by placing cargo closer to the ground. This improves stability, making it easier for the rider to control the bicycle while carrying heavy items. A lowered frame design helps distribute the weight more evenly, making the ride smoother and safer. This is especially important when carrying heavy or bulky items, as improper weight distribution can make the bike tip over more easily.

#### Safety Features and Visibility

Adding extra cargo requires special attention to safety and visibility. Features such as reflective strips on the cargo racks and reflective tires improve visibility for night riding.

#### METHODOLOGY

#### **Research and Problem Identification**

Firstly Study limitations of traditional bicycles in carrying extra luggage and also review existing cargo bicycle models and gather user feedback. Understanding real-world usage and concerns will help in redesigning a bicycle that effectively balances load capacity, safety, and riding efficiency.

#### Design Concept Development

Make a folding cycle frame design and to enhance cargo capacity, modular racks or baskets are added for flexible storage. These features allow riders to carry different types of loads efficiently. Lowering the center of gravity ensures better stability and control while riding with extra weight. This prevents imbalance, making the bike safer and easier to handle. **Fabrication and Accembly** 

#### Fabrication and Assembly

We extend the cycle frame at rear side by joining the iron rod with the help of welding. The folding mechanism is created by using hinges and the carrier is made by iron with sheet metal so that it can sustain more load without lowering the efficiency of cargo cycle.

#### A. Prototyping and Testing

To make sure the bike can carry extra weight safely, the frame and cargo racks are tested for strength and durability. This ensures the bike remains stable, easy to ride, and safe even when carrying heavy loads.

#### CARGOCYCLE FRAME DESIGN



The above figure shows the innovative frame design for CargoCycle ensuring it's stability. The rear wheel is positioned further back to accommodate the cargo area. A longer wheelbase contributes to better stability while carrying loads. This design showcases an innovative CargoCycle concept that integrates balanced cargo placement, and an extended frame to enhance performance and comfort.



The carriage of Box type shape is fixed on CargoCycle which gives the more space to user to deliver groceries, newspaper and etc.

#### CONCLUSION

The redesign of traditional bicycles into cargofriendly models presents a sustainable and efficient solution for modern transportation challenges. By integrating cargo space while ensuring balance, stability, and rider comfort, Cargo Cycle offers a practical alternative for urban commuters, delivery professionals, and general cargo transport.

The use of a foldable frame design, modular cargo storage, and weight distribution techniques enhances the functionality and adaptability of the bicycle. Additionally, incorporating safety features such as reflective elements and lockable compartments further improves usability and security. Beyond



individual benefits, this redesigned cargo bicycle contributes to a greener, more eco-friendly urban mobility system by reducing reliance on fuel-powered vehicles. By providing a cost-effective, accessible, and sustainable transportation option, Cargo Cycle supports global efforts toward reducing traffic congestion, air pollution, and carbon emissions.

Future developments may focus on lightweight material enhancements, electric-assist integration, and advanced stability mechanisms to further refine the design. Ultimately, this study demonstrates that with thoughtful engineering and innovation, bicycles can be transformed into highly functional cargo carriers, shaping the future of sustainable transport.

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