

“Improved Animal Cart”

The project titled, “Design and Development of Three Wheeler Efficient Bullock cart” was undertaken at Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon to deal with following problems with the present design of the bullock cart:

- Heavy Neck-load /Cruelty
- Low Energy Efficiency
- No Standardization/optimization in design
- Insufficient area of trolley
- Selection of improper materials often leading to failures.
- There are almost no facilities for the user like seat for driver, lighting system for the cart etc.



Objectives of the project:

To design and develop a Bullock-cart to:

1. Minimize the neck load through addition of wheels,
2. Improve energy efficiency,
3. Optimize size, shape and material of every part of the bullock cart, like wheel, axle, pull beam etc by computer simulation using software like ANSYS,
4. Standardize the design of modular cart with provision to add or reject extra facilities,
5. Improve Life at appropriate cost, through proper design and selection of proper materials.
6. Provide additional facilities like battery-charging system, lighting system, driver's seat etc.
7. Provide a facility to drive the same cart with either one or two bullocks.

Innovations Introduced:

- 1) Four wheels of 3 feet diameter:

The wheel diameter has been reduced from 3.75 m to 3 m. With this change, the platform can cover the wheels totally. This has increased the usable platform area from 15 m² in conventional cart to 35 m² in this cart.

- 2) Addition of leaf springs:

The trolley rests on the two axels through four leaf-springs. The leaf-springs acts as shock-absorber and provide comfort to the riders. The leaf-springs also provide more stability to the vehicle.

- 3) Detachable pull rods:

The pull-rods can be detached from the main trolley. Once detached, any other farm implement can be attached to the pull-rods for use in farming. Thus the pull-rods and the neck-rod serve double purposes.

4) New design of neck-rod:

The neck rod facilitates use of either a single bullock or a pair of bullocks as per availability and convenience.

5) New design of wheel:

The wheel diameter has been reduced to 3 m. The number of spokes has also been reduced to 8 from 12 in the conventional carts. If wheel-rim with 'T' cross section is not available, the wheel can be made with a plane metal strip. We introduced a new spoke-design which can provide equivalent strength as in the case of wheel with rim of 'T' cross-section.

6) Addition of White-LED based front light and radio system:

The cart is provided with a White-LED based front light and radio system. The system consists of a 3 Watt white-LED driven by a battery. The battery also drives a AM/FM radio system built in the same cabinet. The battery can be charged either through mains or through solar module.

7) Addition of break system:

A pedal operated break-system has been was introduced into the cart model.

Comparison of Conventional bullock-cart and the modified cart.

Parameter	Conventional	Modified
Length	75" + 92" = 167"	84" + 80" = 164"
Height	33" + 24" = 57 "	38" + 23" = 61"
Platform area	~ 18 sq feet	35 sq. feet
Weight	~ 275-300 kg	405 kg
Cost	Rs. 20,000 to Rs. 22,000/-	~ Rs. 30,000/-

Some Photographs:



Modified cart



Same cart driven by single animal



Cart with 1000 kg load

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