

Modified Bullock Cart-Literature Review

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Abstract— Bullock and bullock cart plays an important role in every farm based activity since long history. With the advent of technology, the farming methods and equipment's used changed drastically. It is evident that, there is no significant development and modifications carried and incorporated in the animal driven cart used for agricultural activities. There are few researchers who have contributed in the developmental aspects of the cart. This paper is a review of research work carried by various researchers in this area. The paper will give insight to basics of design of a bullock cart and the summary of research work done up till so that further research may be outlined. A primary solution to the problems presented in various research papers are proposed as a conclusion of this paper.

Key words: Bullock, Modified Bullock Cart

I. INTRODUCTION

Considering, the present scenario of oil crisis and inflation ratio, its need of time to go for alternative sources of energy in every field. Though there is huge availability of technology in the field of agriculture machinery and transportation, but it all works with the help of oil and petroleum products; while taking into considerations of petroleum products current situation, global condition of oil. The prices are hiking and storages are limited; the advance country like America just has its sources lasting up to next 40 years. Therefore alternative sources such as nuclear, tidal power, solar, wind etc. sources come into picture. But these sources are beneficial in the field of thermal engineering. What about the field of transportation?

It becomes very difficult to implement these sources for transportation purpose.

By considering all these reasons it is necessary to built up some different arrangement for ruler transportation as there is a need to improve the existing one.

To built up the new one it need an extra effort but it takes a little effort to improve the existing one and it can be more efficient.

The country like India where the world's largest animal resource is available and from old times it is being used for transportation in ruler areas with the help of animal driven vehicles i.e. ADVs will be the best solutions for future transportation in ruler areas. In India, though it is developing country in terms of technology, still 15 million ADVs are being used. Out of which 13 million is being driven by oxen.

But the present bullock cart is suffered from various drawbacks or very poor technology is used to build the bullock cart and its efficiency is also less.

If the technology is improvised and is utilized to improvise the existing bullock cart, it will definitely helpful for the farmers and it is also beneficial to solve the ruler transportation problem.

This is an attempt made to collect all available research papers and combine review is made available to the

researchers over the bullock cart from last 40 years for their support to extend their research in this field.

II. A STUDY ON BULLOCK CARTS PART-2 EXPERIMENTAL STUDY OF FORCES IN BULLOCK CART

M.R. Raghavan et.al. used the strain gauge load cell with separate bridge to measure the neck load and bending moment in the cart. Also the pull generated in the cart. The comparative study is conducted in between the cart with steel rimmed wooden wheels and pneumatic wheeled cart on different road conditions such as tar road, grassy terrain and mud road.

It is found that the bullock pulls the cart discontinuously at the low velocities at which the cart normally operates.

On the grassy terrain it is found that the mean static coefficient of friction between road surface and the steel rimmed wheels is more than the pneumatic wheel cart. The dynamic friction resistance of steel rimmed wooden cart is lower than pneumatic tire wheel as long as the steel rimmed wheel does not dig or sink into the terrain.

The ground induces low amplitude high frequency vibratory loads content in the neck load is lower in pneumatic wheel cart.

III. VALUE ENGINEERING OF THE OX CART- A PROJECT TOWARDS THE GOAL OF WORLD HAPPINESS

S.S. Venkatramanan in this paper gives the detailed about the bullock carts features, potentials and the limitations; along with that suggested the various impacts of bullock cart structure on the environments and the life on the bullock.

IV. IMPROVING OX YOKE WITH LIMITED MATERIAL, TOOLS AND RESOURCES

David Kramer in this tech guide the author describes the various types of yoke. He has concluded the comparative study on the basic differences between ox design in North America and Africa.

This article offers some feasible suggestions for improving yoke design, and constructions techniques for improving the power transmission without hampering the life of ox.

V. NECK YOKE DESIGN AND FIT – IDEAS FROM DROPPING HITCH POINT TRADITIONS

Richard Rosenberg in this tech guide analyzed the several factors that should guide the impact of hitch point depression. The important factors under considerations are:

- Neck width
- Tasks offering the spacing of team
- The impact of depth of hitch point
- Equality of team

The analysis of yoke and the impact of stated point on the yoke design is considered and studied, also the

impact of planned placement of bow holes and staple, and its thickness and length of the yoke beam on animal anatomy and power transferred is also studied.

For the better and comfort power transmission, increasing the area of contact between neck surface and yoke rod, the design of yoke is modified in semielliptical curved shape by dropping hitch point. This leads to better results.

VI. DESIGN REFORMATIONS AND PERFORMANCE

EVALUATION OF BULLOCK DRIVEN INSDAG STEEL CART FOR SUSTAINABLE RURAL TRANSPORT

M.K. Ghosh et.al.in this paper focused on the study of the destruction caused by the bullock cart on the road. The effort has been made to reduce the deterioration of road condition by improving the cart; also the cart is equipped with the braking system (rubber liner brakes).

The various experiments are carried out to determine the impact of various loading conditions of cart on the brake lining, i.e. to study the wear pattern of rubber lining at different payloads. The evaluation of work performance of modified cart with the existing cart is also carried out and the conclusion is drawn that work done is quite satisfactory.

VII. FEA ANALYSIS OF BULLOCK CART AXEL UNDER STATIC AND DYNAMIC CONDITIONS

Mulani Nawaj et.al. Proposed the work in this paper deals with the designing failure of the axel of the cart under the different loading conditions. Here the axel is redesign and analyzed by considering the different failure conditions such that as static and dynamic loading conditions, velocity and different road conditions; and it is concluded that the performance is improved along with the reduction of present axel weight by 22.5%.

VIII. CONCLUSIONS

The structure of cart, its design and optimization has been the focus of previous work. The review of some of the previously conducted work related to cart structure design, analysis and optimization using software's and its impact on the bullocks is surveyed. It is found that the work is done to predict the loop holes such as the function ability of the cart, its efficiency, and the improvement. So that the efficiency can be increased; and the life of cart can be enhanced. This study makes the case for further investigation on design of the cart by using different concept and software.

IX. FUTURE SCOPE

The future scope must focus on life-cycle study and test to access the reliability and longevity of the cart. In addition the cart modelled structure can be improved with the help of software's and validate with the help of experimental results to correctly predict the design modifications and induced stresses. Additional efforts are needed to reduce the bullock drudgery and enhancement of their life without hampering their efficiency and improve the overall efficiency of cart.

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