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Comparative performance evaluation and wear pattern study of rubber liner on the iron wheels of a modified steel bullock cart on tar and earthen roads of rural Odisha

■ **M.K. GHOSAL, S.K. SWAIN, A.K. DASH** AND **A.K. MOHAPATRA**

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See end of the Paper for authors' affiliation

Correspondence to :

M.K. GHOSAL
Department of Farm Machinery and Power, College of Agricultural Engineering and Technology, Orissa University of Agriculture and Technology, BHUBANESWAR (ODISHA) INDIA
Email : mkghosal1@rediffmail.com

■ **ABSTRACT :** An improved steel bullock cart (2.0 tones capacity) of INSDAG (Institute of Steel Development and Growth, Kolkata) design has been evaluated after putting rubber liner on its iron wheels as a modification, with a view to study its suitability in preventing damage to the surface of rural roads. The experiments were conducted during the year 2012 for the steel cart with rubber liner both in tar and earthen roads of Central Farm, Orissa University of Agriculture and Technology, Bhubaneswar, Odisha. The cart was tested with a pair of non-descript small size bullocks having a pair body weight of 420 kg. Small size bullocks were chosen for the study as bullock cart is still used as a mode of rural transport in tribal dominated areas of the state of Odisha where small size bullocks are mostly available. The results indicated that the small size bullocks could sustain pulling the pay loads of 1200 kg and 1000 kg continuously for three hours in tar and earthen road, respectively with the work rest cycle of 1 hour work + 15 min rest + 1 hour work + 20 min rest + 1 hour work. The draft and power requirement were found to be less and the corresponding speeds to be more in case of tar road compared to the earthen road. There was no significant difference in percentage of wheel slippage between tar and earthen road conditions. The cart was found to be working nicely without damaging the road. At the sustainable load, the wear per cents of rubber liner were more in earthen road than the tar road. The rubber liner can be used safely in the steel cart for about 550 and 220 hours in tar and earthen road, respectively without damaging the surface of road before its replacement. The cost of the rubber liner used in both the wheels of the cart was Rs. 1000/- @ Rs. 40/- per feet length. It is, therefore, concluded that steel cart with rubber liner on its iron wheels is suitable and cost effective for sustainable rural transport.

■ **KEY WORDS :** Steel bullock cart, Rural transport, Bullock power, Earthen road

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