NATIONAL THIRD - MECHANICAL

Modified fixture of dozer blade with tractor

Madan Lal Kumawat
Sikar, Rajasthan

Madan Lal (52) owns an agricultural machinery repairing and manufacturing workshop. He has modified the design of fixture/frame of the dozer in tractors, which has resulted in easy repairs, transportation and maneuverability.

His father was a carpenter and earned his livelihood by working on daily wages in the village. Madan Lal had his initial education at home till he was about ten years old and then was admitted to the village school in class one. Though he was good in studies but discontinued his studies after class two after a major accident, which left him quite weak physically. He decided to learn tailoring and also carpentry from his father. Slowly as he gained physical strength, he switched over full time to carpentry, which he worked for a few years.

Later, he got inclined towards metal engineering work and associated himself with a workshop in a nearby village to learn necessary skills. Spending about nine years in the workshop, he learnt all the technicalities and intricacies involved in metal work and especially agricultural machineries/ implements. He setup his workshop at Danta in 1997, where he repairs agricultural and constructional machineries and sometimes does modifications according to requirement of the customers. In his work, he is assisted by his younger brother and lives with his wife and three children. Madan Lal is habitual of working about 15-18 hours a day to which his family has somewhat adjusted now.

Multicrop thresher

During nineteen hundred eighties and early nineties, the manufacturers and dealers of agriculture implements in Rajasthan use to bring threshers from Punjab for selling in the state. The workshop owners mainly undertook repair work as per demand. Madan Lal realized that this could be an opportunity and started thinking about manufacturing them. He started developing the first thresher at the workshop where he had been working. After about 20-30 days of efforts he could develop a thresher whose performance was comparable with the

existing ones. During its development phase he identified the scope of improvement in the design of the thresher so as to improve its performance. He then started working on the ideas generated during the development. He incorporated blowers and cutting mechanism (1991) at the first stage to simplify the threshing mechanism. Later he modified the beaters and optimized speed of blower to make it suitable for many crops (1993). In 1997 he optimized the size of the drum and the beater, and increased the length of the thresher to reduce the load on the prime mover. He again optimized the design to reduce the changeover time of the fitments. The change over from one crop to another in his machine takes only 15-20 minutes as compared to 2-3 hours in other alternatives. He received an award from National Innovation Foundation in 2001 for his improved thresher. Indian patent has also been granted for his thresher (patent no. 253863). NIF has supported him under Micro Venture Innovation Fund (MVIF) for expanding his business. He has also been awarded by the State Government for the same innovation in November 2004. In year 2010, he was chosen by Forbes Magazine as one of the seven most powerful innovators of Rural India.

Unlike other multi-crop threshers it has a differently designed threshing cylinder (blade edged spike tooth instead of normal spike tooth) and an additional blower. It has multiple drive options to change the speed of threshing cylinder (400-500 rpm) and varying air flow according to crop and can thresh all the crops including groundnut and cumin. It can be operated by tractor of size 35 hp or above through PTO. In addition to threshing drum there is a primary cutter that cuts straw before threshing, thus reduces power consumption. The average threshing efficiency, cleaning efficiency, grain damage, grain blown, spilled grain, total loss are much less than the permissible

limit 99.60%, 99.07 %, 0.25%, 0.36%, 0.30 %, 0.91%, and 5%, respectively. He has sold over 150 modified threshers.

The dozing attachment

In 2013, a farmer got dozer attachment fitted in his tractor from Kota, Rajasthan at the cost of Rs. 90,000/-. The design was same as that of Bull India, which charged Rs. 150,000/- that time. There was need of a dead weight at the rear for proper balancing. Due to the lack of a hinge, the attachment was fixed. The chassis used to break down frequently due to the improper distribution of load. As the chassis was fitted taking support from sides of front wheels extended outward, maneuverability of tractor was difficult after attaching the dozing attachment. Also, in order to repair clutch plate, which wears fast due to half-clutch engagement in dozing operation; the whole unit was required to be detached. To solve these problems, he decided to improve the attachment and successfully developed it in six months' time.

Initially, he made the chassis as one single unit but due to the difficulties in repairing the clutch, he remade it in two parts, so that the chassis can be split as and when needed for the repair of the clutch plate. The modifications include three supports from rear wheel mud guard bolts, tractor chassis and center of front part by attaching a plate.

The modification has resulted in no breakage of chassis and easy maneuverability. Further transport from one place to another has become easy due to reduction in width. He has made over 35 units in the last three and a half years for tractor owners from different states of country including Uttar Pradesh, Maharashtra, Gujarat, Madhya Pradesh and Rajasthan.