

Study of Parameters to be checked for modification in changing Disc Wheel for Radial tyre in Four Wheelers

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Abstract - it is almost mandatory now a day to install radial tyres in four wheelers. Installation of radial tyres gives freedom from maintaining in old vehicle tyres arrangement in front and rear tyres as they are different in construction. The edges for both the tyre tread is different. In radial tyres all the tyres are of same shape and size. It can also be used anywhere that is in front or rear wheels. The radial tyres also used for aesthetic new look of the old vehicle. This paper is focused on the problem faced during the tyre changing discussed in detail and the new technique suggested. As most of time the radial tyres are changed of old four wheelers vehicles. And the budget for changing the same is very less.

Key Words: Disc wheel, Alloy wheel, Radial, Tyre, and Rim

1. INTRODUCTION

It is very common now a day to change the old vehicle normal tyre (Cross ply or Bias ply) with radial tyre (Radial ply). Both the tyres are having advantages and disadvantages over each other. The users select the radial tyres mainly for its aesthetic looks and road grip. Automobile manufacturers presently preferred installing radial tubeless tyres in the vehicle. The radial tyres give better grip and stability on road as well as increase in ground clearance. The old model vehicles which are having factory fitted cross ply tyres can also replace with radial tyres. But the radial tyre must be available in the market for the same rim diameter. If it is not available in the market than they have options to purchase the disc wheel or alloy wheel. In both the cases the pitch circle diameter (PCD) and number of holes of housing flange must be match. So that it can be fixed easily with tyres on the wheel assembly. So in both the cases modification in housing bolts is needed while fixing the new disc wheel or alloy wheel.

2. Cost of Wheels and Tyres

The cost of alloy wheel is much higher than the tyre itself. The cost of an Alloy wheel is ranging from Rs.8000 to Rs.15000 [1]. The cost of Disc Wheel is in range of Rs. 2000 to Rs. 5000. The cost is higher for alloy wheel as its construction of material and aesthetic design. It is also depends upon cost of the vehicle.

The cost of front cross ply tyre 6X16 for Mahindra Major MI 540 is Rs. 3700 to Rs. 4300 per tyre. The rear tyres cost ranging between Rs. 4300 to Rs. 4500 per tyre [2]. The

size 6X16 indicates 6 widths in inches (152.4mm) and 16 inches is the diameter of rim. The Radial tyre for same Rim diameter is 215/65R16 of a Duster model of Renault Motors is Rs 7250. Here 215 widths in mm, 65 is aspect ratio, R for radial tyre and 16 is the diameter of rim in inches.

So it can be seen that for Disc wheel if the radial tyre is not available it must be searched for best match for disc wheels and tyres. For example Mahindra MM540 DP the best combination is Maruti gypsy rims and Mahindra Scorpio radial tyres. Again searching and arranging the same of 5 nos. is very difficult.

But it is useful to change the cross ply tyres to radial tyres as the cross ply design of front and rears are different. With the availability of one extra radial tyre it can be changed any time.

3. MODIFICATION PROBLEMS

For alloy wheel or new disc installation the main following parameters to be kept in mind, For installing new alloy wheel or disc have to modify the holes for mounting the alloy wheel. In most cases the PCD (pitch circle diameter) is not matched. Mounting arrangement for disc brake system is to change holes position of wheel hub and disk brake rotor for installing stud. In Drum brake system it has to change the holes position for brake disc to insert stud.

The Radial tyre mounting on alloy wheel or new disc wheel is having higher width. So the inner well diameter is checked as this increase width must not contact with vehicle body while rotating the steering. In cross ply tyres the aspect ratio is 100% where as in radial tyres the aspect ratio is maximum 70%.

The change is also in any of either wheels is done it is to be kept in mind that the wheel offset is to be checked. The steering is designed for negative or positive offset of the wheel. If either of them is changed the steering becomes hard to operate. For example if wheel of gypsy vehicle used in Mahindra MM540 jeep the steering becomes harder to operate.

After the selection of rim dimension and fixing the radial tyre it must be checked for wheel balancing. As in wheel balancing the wheel is checked for camber, toe, castor, run out etc.

4. SUGGESTED NEW TECHNIQUE

There are many more modification problems comes while installing both new disc wheel and alloy wheel. But as the cost is getting higher in every modification a new technique is developed to change the wheel from cross ply tyre to radial tyre.

In this technique the flange containing holes mounting of old vehicle is cut with help of gas welding. New wheel and tyre of same size is arranged [fig 1]. For example if we want to change Mahindra major model tyre size 6X16 we can select Renault Duster model wheel sizing 215/65R16. The tyre is removed from rim. The hole of mounting flange is cut with help of gas cutting. The old rim flange is welded in new wheel. Then to correct the offset the entire circular shape below the rim well is cut on lathe. The rim offset is provided measured as per the old rim. Welding is done at the complete circular section below rim well. The rim offset may be positive or negative. Positive offset will narrow down the track as negative offset will widen the track.

At last the radial tyre is fitted on the new modify rim. It is checked at wheel balancing machine. Now the wheel is ready to be fixed. The cost is very much less in this modification. The wheels of new model can be arranged from second sellers. The complete machining cutting, lathe, welding and wheel balancing will cost approximately Rs. 1500 in each wheel.

easy to replace. Proper care should be taken for wheel balancing after installation of tyre on disc wheel.

REFERENCES

- [1] Data taken from different websites available on internet.
- [2] Tyre cost is taken of all major tyre manufacturers from local dealer.

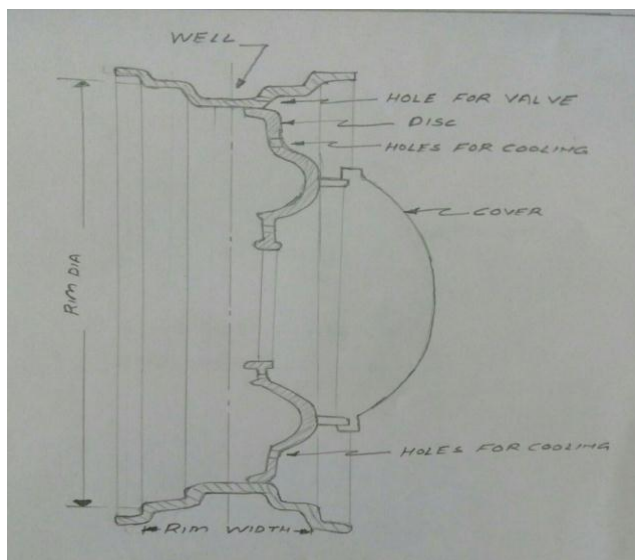


Fig -1: Details of Disc Wheel

5. CONCLUSIONS

As it is clear from above paragraphs to change the wheel flange technique can save the cost and operation time to modify to install the radial tyre. Set of required wheels and tyres size arrangement with affordable amount is the only problem. Rest with the flange replacing technique it is very