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With reference to information provided by the tyre companies regarding height tolerances, this information is provided for the benefit of optimizing tyre wear & reducing the risk of mechanical failure due to mis-matched dual wheels

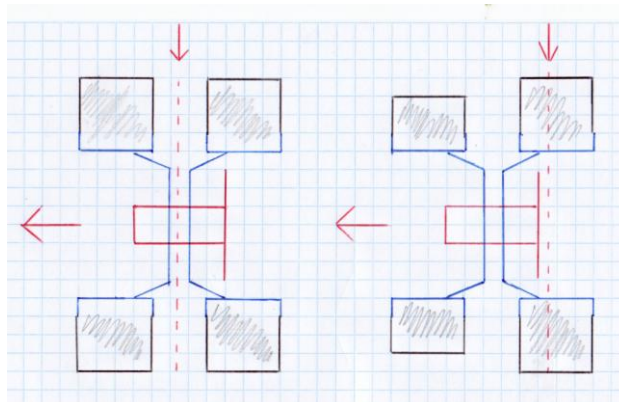
In regard to your question, how would mis-matched dual wheels affect a Letourneau Model 5594 Dual Wheel front drive Log Stacker?

The implications to mis-matched dual wheels are many and varied, ranging from rapid & irregular tread wear of the tyre, to mechanical failure due to uneven weight distribution. This not only applies to the Log Stacker but also all other types of machinery fitted with dual wheel assemblies.

Dual wheel assemblies, (as stated in previous documents) are designed to work as one wheel. Machinery & wheel manufacturers design & manufacture wheels with back spacing (offset) to provide even weight distribution over the centre line of the hub or wheel ends, or as per the machine manufacturer's specification.

When mis-matched wheels are present in a dual pair, the difference in diameter, (referred to as height in most literature relating to the tyre industry) affects how the load is applied to the centre line of the hub or wheel ends. Example;

A road freight truck fitted with dual wheels has a mis-matched pair. The inner wheel is larger than the outer. The result would be the failure of the inner wheel bearing as a result of an increase load over the inner bearing. Reverse the situation & the outer bearing would fail. I have provided a simple diagram to support this. See below.



Whilst this diagram is very simple & shows an exaggeration, it clearly shows a shift in weight distribution over the hub & wheel ends when a difference in tyre size is present.

The correlation between the Letourneau Log Stacker & a road freight truck are similar, (the load is applied as a downward force over the dual pair) however, taking into consideration the type of work performed by the Log Stacker in relation to the Freight Truck, we are faced with very a different result.

In the case of the Freight Truck, the load is confined within the boundaries of the outer wheel. The Letourneau however, has the majority of its load outside the boundaries of the outer tyre. When we apply simple physics to this situation in the case of mis-matched tyres, the result is dramatic shift & an increase in the load applied to the hub & wheel ends.

As the distribution of weight information above, refers to the height or diameter of the tyre & applies to the STATIC load, we now introduce the circumference of the tyre, this makes the situation worse.

I previously stated. Dual Wheel Assemblies are designed to work as ONE wheel (i.e. both wheels fixed together), it is essential that both wheels have the same circumference.

In the event of a mis-matched dual pair, the smaller tyre will show Irregular Wear before the larger tyre. Thus the SMALLER tyre will wear out faster than the larger.

To explain this non logical situation, the distance traveled with one revolution is dictated by the circumference of the tyre, (Remember the dual assembly is working as ONE wheel therefore fixed together) therefore the distance traveled must be dictated by the LARGER wheel.

As it is physically impossible for the Smaller wheel to travel the same distance as the larger wheel by its circumference, and being fixed to the larger wheel, the smaller wheel is forced to catch up to the larger by way of scuffing along the road, therefore will show signs of irregular wear before the larger tyre.

Thus the introduction of how torque is applied to a driven wheel. The greater amount of torque required, will be applied to the larger wheel, as the static load is greater, thus providing the larger wheel with more traction. In addition to this, (with reference to above) the larger wheel is forced to drag the smaller wheel with it, resulting in another increase in the amount of torque required. The result of this is an increase above that of the STATIC load that is applied to the wheel ends.

This increase in load coupled with the shift in load due to mis-matched tyres could certainly result in the premature failure of the wheel ends & or wheel bearings.