

Taper vs. Straight Tread Crane Wheels

By J. A. BELL, Chief Engineer, Bethlehem Steel Co., Bethlehem, Pa.



. . . . perhaps no topic will arouse more controversy than rail or wheel design for cranes actual test results give factual data

▲ THE subject of taper tread vs straight tread crane wheels has been discussed by practically every maintenance man who has had anything whatever to do with cranes, and certainly by all crane designers and engineers. Each one is quite certain that his theory is the correct one, and will endeavor to give what, in his estimation, is a very valid reason why he can prove his theory, which is of course based on actual operating practice.

The writer has been one of the same school, who, feeling that he knew the answer to the problem, has set out to prove his theory to be the correct one whenever the occasion presented itself. Nevertheless, in all the discussions and meetings devoted to the subject, no one seems to have actual conclusive evidence to prove his point, whether he favors the taper or the straight tread.

It is next to impossible to obtain accurate data through experiments conducted on runways now in existence, since neither the crane nor the runway can be considered to be in perfect alignment, and it would be a waste of time to base conclusions on anything but an absolutely straight and level runway.

The best results could only be obtained by erecting a runway for this particular purpose, with no tie to any other structure. Likewise, the crane to be used should be a complete new crane with all points checked for alignment, and with the end trucks accurately squared with the bridge, and the wheels accurately machined to uniform diameters.

This of course would involve considerable expense, and while it would be well worth the cost from the standpoint of savings affected in future maintenance, we would all no doubt find it difficult to sell this particular idea in preference to the many other problems

which are considered just as important throughout the steel industry.

Therefore it has been the writer's idea for some years, to develop a working model of a crane, with metal wheels operating on a metal track, using both taper and straight tread wheels, changing the wheels to obtain every conceivable operating condition.

This should involve taper tread driver wheels used with straight tread idlers; taper tread idlers used with taper tread drivers, and straight tread wheels used for both drivers and idlers.

The model should also be designed to permit adjustment of the crane span as well as of wheel spread on the end trucks in order to determine exactly what ratio would give the best operation.

One point should be clarified on the question of the types of wheels to use on cranes. If crane runways were in perfect alignment, with no outside forces tending to create misalignment, and if the crane is properly designed as to ratio of wheel spread to crane span, there would be absolutely no reason for installing taper tread wheels on any crane.

The reason for this is that clearances between rail head and wheel flanges could be reduced to a minimum, and this would therefore eliminate any tendency to throw the crane out of line to a skewed position on the runway. It is this skewing of the crane that causes continual riding of the flanges, and thus shorten the life of both the wheels and the rails.

But since accurate runway alignment is not the general rule, and we all recognize the difficulty of maintaining it (particularly in old buildings), we are faced with the problem of finding a solution. The first thing to determine is which installations call for taper treads and which call for straight treads, for certainly neither