Minimum Weights for Rolling Stock

Before plastic kits appeared, most model rolling stock, whether consisting of four-wheeled open wagons or twelve-wheeled Dining Cars, was heavy. In addition, the common use of wheelsets with large diameter axles running in white metal bearings produced a high rolling resistance. (see also Data Sheet D3.1.1). A really powerful and heavy loco was needed to move a 25 wagon train, or one of ten coaches. A typical wagon of that period would weigh 180 gm (6.3 oz) and have a rolling resistance of 6 gm (0.2 oz), a coach weighing 1000 gm (35 oz) would have a resistance of 30 gm (1.1oz).

The coming of plastic kits and the general use of wheels with axle journals of .070" diameter or less running in low friction bearings, brought a dramatic reduction in weight and rolling resistance. Wagons now weighed as little as 55 gm (1.9oz) with a resistance of less than 1 gm (0.1 oz). Longer trains could now be hauled and locomotives did not have to be so powerful. Backing such stock however, especially in long trains, often brought trouble.

If good and consistent running, especially when propelling, is to be obtained, vehicles must be accurately and soundly constructed and free running. This is fundamental; equalising or springing, correctly applied, will help lighter wagons to overcome track deficiencies, but gross weight is critical in the prevention of derailments. When propelling, this applies particularly to the wagons nearest to the locomotive, since they are being pushed against the mass of the train and its resistance to rolling. If small trains are the invariable rule on a particular line, reduced weights may be considered. However, such stock is likely to be less reliable if run on layouts where long trains are the norm.

During tests that produced train resistance data, very light wagons were found to be prone to derailment. From these experiments a guideline can be recommended for which the standard gauge 4-wheeled wagon of 18ft to 19ft in length and having a 9ft/10ft wheelbase (125mm or 5in in model form) is the basis. The increase in weight for increasing length is 25gm per 25mm, or 1oz per inch. This caters for longer wagons, 6-wheeled stock and bogie stock, including coaching stock and, conveniently, is roughly 1gm for each 1mm of vehicle length.

In general, it will be found that bogie stock seldom needs additional weight, 4-wheel wagons assembled from plastic kits nearly always do.

Summarising – We recommended that model rolling stock should weigh not less than 1 gram per millimetre of vehicle length (equal to approximately 1oz/in) with a minimum weight of 125gm (4.4oz).

Examples

Description	Length	Actual weight	Suggested weight	Additional weight required
Slater's mineral wagon	125mm - 5in	62gm	125gm	63gm
Lima lwb wagon	230mm - 9.5in	150gm	230gm	80gm
Bachmann MEA	171mm – 6.7in	234gm	175gm	None
ABS open wagon	140mm - 5.5in	216gm	140gm	None
Lima BR Mk1 coach	450mm - 18in	410gm	450gm	Acceptable
Kirk LNER bogie third	380mm - 15in	385gm	380gm	None
Exley LMS BTK	420mm - 16.5in	852gm	420gm	None
Bachmann Mk 1 coach	444mm - 17.5in	800gm	444gm	None
Branchlines SR Compo	430mm - 17.in	900gm	430gm	None