The minimum thickness of any plate is taken at ⅛", and the moment of inertia of web plate is not considered in calculating girders, side posts, etc., unless the thickness is 3/16" or over. The flange members have the area of rivet holes subtracted, except in the case of flanges that are in compression only, in which case the total area is used. All of the several designs are considered to be built of structural steel with the exception of cast steel centre plates, centre sill separators above centre plate, cast steel connections between bolster and crossbearer ends and side sills. The maximum stress allowed in bolster flanges is 12,500 pounds per square inch and 16,000 pounds elsewhere, except that in one or two cases where the moment of inertia of web plate has not been taken into consideration, the stress has been allowed to slightly exceed this figure.

When the actual weight and load of the car is known, it is comparatively easy to determine the stresses due to this total weight, but the stress due to end shocks cannot be accurately determined either theoretically or by experiment. In the absence of authentic information as to the actual magnitude of these shocks it has come to be a generally accepted practice to consider these as equivalent to a static load of 400,000 pounds acting along the line passing through the centre of gravity of the existing resistance capacities of the buffer and draft gear attachments. Further, it is commonly considered that modern high capacity buffers have a capacity of 250,000 pounds and draft gears 150,000 pounds. These figures have been verified by numerous tests of gears that have been in service and, while the individual equipments will vary considerably, the above figures are about the average. As these capacities are respectively ⅜ and ⅝ of the total, and as the vertical distance between the two centre lines is 12½", the resultant centre line is 7 11/16" above the centre line of draft gear which is taken at the usual standard height of 34½" above the rail.

Cars designed on this basis, while not indestructible by any means, are successful in resisting what are usually considered wreck conditions; in fact there has never yet been a wreck reported involving steel cars in which a sill meeting these requirements was said to have failed in a manner indicating that further increase in strength was either necessary or desirable. This item is specially noted, as needless increase in weight should be carefully avoided in order that cars be as nearly as possible of uniform strength, thereby eliminating the damage that will certainly result in accidents, if some of the cars are decidedly stronger and heavier than others. In such cases it in-