

(c) In place of an engineering analysis, either of the following may be accepted:

(1) Documented technical data of suitable highway tests which were conducted to simulate transportation loads and conditions; or

(2) Acceptable documented evidence of actual transportation experience which meets the intent of this subpart.

§ 3280.904 Specific requirements for designing the transportation system.

(a) *General.* The entire system (frame, drawbar and coupling mechanism, running gear assembly, and lights) shall be designed and constructed as an integrated, balanced and durable unit which is safe and suitable for its specified use during the intended life of the manufactured home. In operation, the transportation system (supporting the manufactured home structure and its contents) shall effectively respond to the control of the braking, while traveling at applicable towing vehicle in terms of tracking and highway speeds and in normal highway traffic conditions.

NOTE: While the majority of manufactured homes utilize a fabricated steel frame assembly, upon which the manufactured home structure is constructed, it is not the intent of this standard to limit innovation. Therefore, other concepts, such as integrating the frame function into the manufactured home structure, are acceptable provided that such design meets the intent and requirements of this part).

(b) *Specific requirements—(1) Drawbar.* The drawbar shall be constructed of sufficient strength, rigidity and durability to safely withstand those dynamic forces experienced during highway transportation. It shall be securely fastened to the manufactured home frame by either a continuous weld or by bolting.

(2) *Coupling mechanism.* The coupling mechanism (which is usually of the socket type) shall be securely fastened to the drawbar in such a manner as to assure safe and effective transfer of the maximum loads, including dynamic loads, between the manufactured home structure and the hitch-assembly of the towing vehicle. The coupling shall be equipped with a manually operated mechanism so adapted as to prevent

disengagement of the unit while in operation. The coupling shall be so designed that it can be disconnected regardless of the angle of the manufactured home to the towing vehicle. With the manufactured home parked on level ground, the center of the socket of the coupler shall not be less than 20 inches nor more than 26 inches from ground level.

(3) *Chassis.* The chassis, in conjunction with the manufactured home structure, shall be designed and constructed to effectively sustain the designed loads consisting of the dead load plus a minimum of 3 pounds per square foot floor load, (example: free-standing range, refrigerator, and loose furniture) and the superimposed dynamic load resulting from highway movement but shall not be required to exceed twice the dead load. The integrated design shall be capable of insuring rigidity and structural integrity of the complete manufactured home structure and to insure against deformation of structural or finish members during the intended life of the home.

(4) *Running gear assembly.* (i) The running gear assembly, as part of the chassis, shall be designed to perform, as a balanced system, in order to effectively sustain the designed loads set forth in § 3280.904(b)(3) and to provide for durable dependable safe mobility of the manufactured home. It shall be designed to accept shock and vibration, both from the highway and the towing vehicle and effectively dampen these forces so as to protect the manufactured home structure from damage and fatigue. Its components shall be designed to facilitate routine maintenance, inspection and replacement.

(ii) Location of the running gear assembly shall be determined by documented engineering analysis, taking into account the gross weight (including all contents), total length of the manufactured home, the necessary coupling hitch weight, span distance, and turning radius. The coupling weight shall be not less than 12 percent nor more than 25 percent of the gross weight.

(5) *Spring assemblies.* Spring assemblies (springs, hangers, shackles, bushings and mounting bolts) shall be capable of withstanding all the design loads

as outlined in §3280.904(b)(3) without exceeding maximum allowable stresses for design spring assembly life as recommended by the spring assembly manufacturer. The capacity of the spring system shall assure, that under maximum operating load conditions, sufficient clearance shall be maintained between the tire and manufactured home frame or structure to permit unimpeded wheel movement and for changing tires.

(6) *Axles.* Axles, and their connecting hardware, shall be capable of withstanding all of the design loads outlined in §3280.904(b)(3) without exceeding maximum allowable stresses for design axle life as recommended by the axle manufacturer. The number of axles required to provide a safe tow and good ride characteristics shall be determined and documented by engineering analysis. Those alternatives listed in §3280.903(c) may be accepted in place of such an analysis.

(7) *Hubs and bearings.* Hubs and bearings shall meet the requirements of §3280.904(b)(3) and good engineering practice. Both of these components shall be accessible for inspection, routine maintenance and replacement of parts.

(8) *Tires, wheels and rims.* Tires, wheels and rims shall meet the requirements of §3280.904(b)(3). Tires shall be selected for anticipated usage.

(9) *Brake assemblies.* (i) The number, type, size and design of brake assemblies required to assist the towing vehicle in providing effective control and stopping of the manufactured home shall be determined and documented by engineering analysis. Those alternatives listed in §3280.903(c) may be accepted in place of such an analysis.

(ii) Brakes on the towing vehicle and the manufactured home shall be capable of assuring that the maximum stopping distance from an initial velocity of 20 miles per hour does not exceed 40 feet (U.S. Department of Transportation Regulations).

(10) *Lights and associated wiring.* Highway safety electrical lights and associated wiring shall conform to applicable Federal requirements in terms of location and performance. The manufacturer shall have the option of meeting this requirement by utilizing a tem-

porary light/wiring harness provided by the manufactured home transportation carrier.

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