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SAFETY BRIEF

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Trailer Hitches & Towbars†

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Abstract

A survey of trailer hitch requirements in the 50 United States has highlighted problems of uniformity, communication, suitability and design specificity.

I. Introduction

Americans are hauling. Their tools, their toys, and their toilets abound on our highways. Collisions with runaway trailers weighing several hundred to several thousand pounds result in tragedies every year. Trailer uncoupling usually results from failures of the ball and socket connectors to remain seated, to retain their structural integrity, or to remain fastened to the towing or towed vehicles.

To control the dangers associated with trailer uncoupling, backup systems in the form of safety chains and/or breakaway trailer brakes are employed. Unfortunately, these backup systems are used haphazardly throughout the United States. This article will help to characterize the nationwide approach to this safety problem.

II. Safety Chain

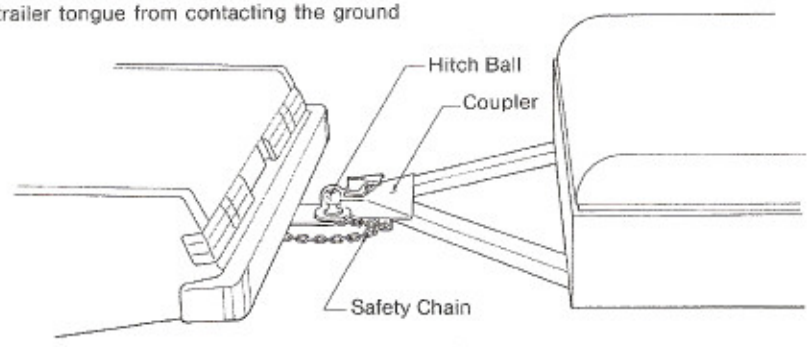
Figure 1 illustrates a safety chain used in the installation of a typical hitch ball and trailer coupler. This system has the following characteristics:

A. The chain is sufficiently slack so that the two vehicles may articulate without placing tension in the chains.
B. The chain is sufficiently short to prevent the trailer tongue from contacting the ground during uncoupling. Dragging the trailer tongue across the pavement would cause a loss of stability of both the trailer and the towing vehicle.
C. The chains are of sufficient strength to hold a decoupled trailer and tow it to the shoulder. Manufacturers provide safety chains in three strength categories: Class I, up to 2000 pounds; Class II, up to 3500 pounds; and Class III, up to 5000 pounds.

III. Breakaway Brakes

These normally employ a spring set braking system on the trailer which always tries to apply the trailer's brakes. A connection, normally electrical, between the trailer and the towing vehicle, provides a continuous supply of energy to overcome the spring action of the brakes. If breakaway occurs, the energy holding the brakes off is interrupted, and the trailer brakes set themselves, bringing the trailer to rest.

An errant trailer will be brought to rest by the breakaway system in the original lanes or in the oncoming lanes. Clearly, the trailer continues to constitute a hazard to the highway traffic, unlike the trailer with a chain system that can carry it to the shoulder under the control of the towing vehicle.



▲ *Figure 1: Typical Trailer Hitch Arrangement*

†*This research was conducted for Triodyne Inc. by the Institute for Advanced Safety Studies.*

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IV. Surveys

During the latter months of 1982, all fifty Secretary of State offices were contacted by mail and telephone and asked to supply driver manuals and state statutes governing trailer hitches, towbars, and safety chains. An analysis of these documents and interviews provided the information contained in Charts 1 through 5.

Chart 1 shows the states requiring safety chains. It is noteworthy that fifteen states have no safety chain requirements.[3]

Chart 2 shows that the majority of states require trailers to have a breakaway braking capability. Fourteen states have no such requirement. An analysis of Charts 1 and 2 together indicates that the following states require neither safety chains nor breakaway brakes: Missouri, Kentucky, Delaware, New Mexico, and North Carolina. This is troubling when one considers that drivers from these states are hauling trailers throughout the rest of the country in violation of other state's statutes.

V. Driver Manuals

Most citizens are introduced to their state statutes relating to vehicle safety in their driver manuals. Chart 3 indicates that 25 states are silent on the issue of trailer safety. This is unacceptable because of the severity of the collision hazard to drivers and pedestrians. Apparently, drivers are expected to learn about trailer hitch safety in high-school driver education programs and by word of mouth.

VI. Towbar Requirements

Closely related to the problem of trailer hitches is the concept of hauling a vehicle by use of a towbar. A typical towbar is shown in Figure 2. The following is a representative towbar requirement:

> "Outside a business, residential or suburban district, or on any controlled access highway, no vehicle . . . shall be towed on a roadway except by a drawbar and each such vehicle so towed shall, in addition, be coupled with two safety chains or cables to the towing vehicle . . ."

Chart 4, however, indicates that 38 states do not require towbars for hauling vehicles. A typical statute from one of these states reads:

> "If one vehicle is towing another, the drawbar or other connection shall be of sufficient strength to pull all weight towed thereby. . . . If one vehicle is towing another and the connection consists of a chain, rope or cable, there shall be displayed upon the connection a white flag or cloth not less than 12 inches square."

This statute lacks specificity and allows the hauler to choose a convenient, rather than a safe method of attachment.

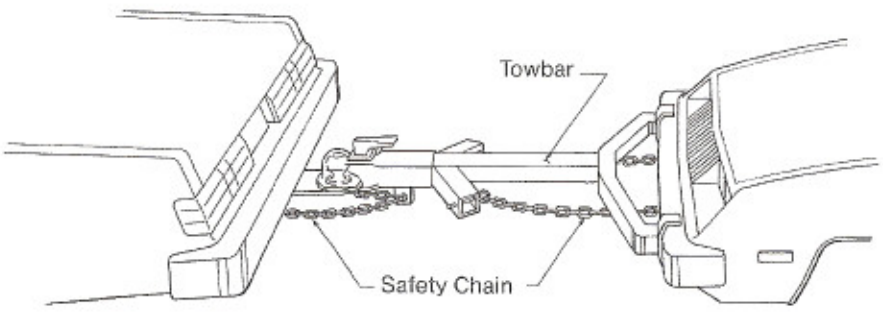
VII. Trailer Brake Requirements

There are 32 states that require that trailers that weigh in excess of 3000 pounds gross vehicle weight be equipped with brakes that operate in conjunction with the ordinary brakes on the towing vehicle. These states are identified in Chart 5 along with ten states that require trailer brakes at weights other than 3,000 pounds. Only three states are silent on the issue of trailer brakes. The usual brake set up involves an electrical connection from the trailer into the taillight of the towing vehicle. This arrangement takes advantage of the fact that application of normal vehicle brakes will energize the taillights.

VIII. Conclusions

From a safety point of view, four conclusions are noteworthy.

A. Detailed specifications must be required to characterize the strength and geometry of the primary towing device together with complete specifications for the backup safety systems.
B. Research is needed to establish the viability of the breakaway brake concept which may not provide a sufficient level of safety.
C. The problem of uniformity of towing requirements among the various states must be addressed since the present system is at best haphazard.
D. The safety implications are sufficiently serious that procedures for proper trailer hauling must be included in all driver manuals.



▲ *Figure 2: Typical Towbar Arrangement*

[3]During our survey, one of the states previously reporting a safety chain statute demurred apologetically. According to their police chief, they had been issuing tickets for years without realizing there was no supporting statute.

Consumer Product Safety Commission's Definition of a Defect

Previous editions of the Triodyne Safety Brief have studied the definitions of product defect that arise from case law. Here, we interpret this pattern to introduce the most current definition promulgated by the Consumer Product Safety Commission:

16 CFR 1115.4 Defect.[1]

Section 15(b)(2) of the CPSC regulation requires every manufacturer (including an importer), distributor, and retailer of a consumer product who obtains information which reasonably supports the conclusion that the product contains a defect which could create a substantial product hazard to inform the Commission of such defect. Thus, whether the information available reasonably suggests a defect is the first determination which a subject firm must make in deciding whether it has obtained information which must be reported to the Commission. In determining whether it has obtained information which reasonably supports the conclusion that its consumer product contains a defect, a subject firm may be guided by the criteria the Commission and staff use in determining whether a defect exists. At a minimum, defect includes the dictionary or commonly accepted meaning of the word. Thus, a defect is a fault, flaw, or irregularity that causes weakness, failure, or inadequacy in form or function. A defect, for example, may be the result of a manufacturing or production error; that is, the consumer product as manufactured is not in the form intended by, or fails to perform in accordance with, its design. In addition, the design of and the materials used in a consumer product may also result in a defect. Thus, a product may contain a defect even if the product is manufactured exactly in accordance with its design and specifications, if the design presents a risk of injury to the public. A design defect may also be present if the risk of injury occurs as a result of the operation or use of the product or the failure of the product to operate as intended. A defect can also occur in a product's contents, construction, finish, packaging, warnings, and/or instructions. With respect to instructions, a consumer product may contain a defect if the instructions for assembly or use could allow the product, otherwise safely designed and manufactured, to present a risk of injury. To assist subject firms in understanding the concept of defect as used in the CPSA, the following examples are offered:

(a) An electric appliance presents a shock hazard because, through a manufac-

[1]"Defect," *16 CFR 1115.4*, Washington, DC, Consumer Product Safety Commission, effective May 14, 1973, (as published in *16 Commercial Practices Part 1000 to End*, Revised as of January 1, 1980).

Chart 1: Safety Chain Requirements

Chart 2: Trailer Breakaway Brake Requirements

- States Requiring Breakaway Brakes
- States Not Requiring Breakaway Brakes
- States Requiring Either Trailer Breakaway Brakes or Safety Chains
- States Not Responding to Survey

Chart 4: Towbar Use Requirements

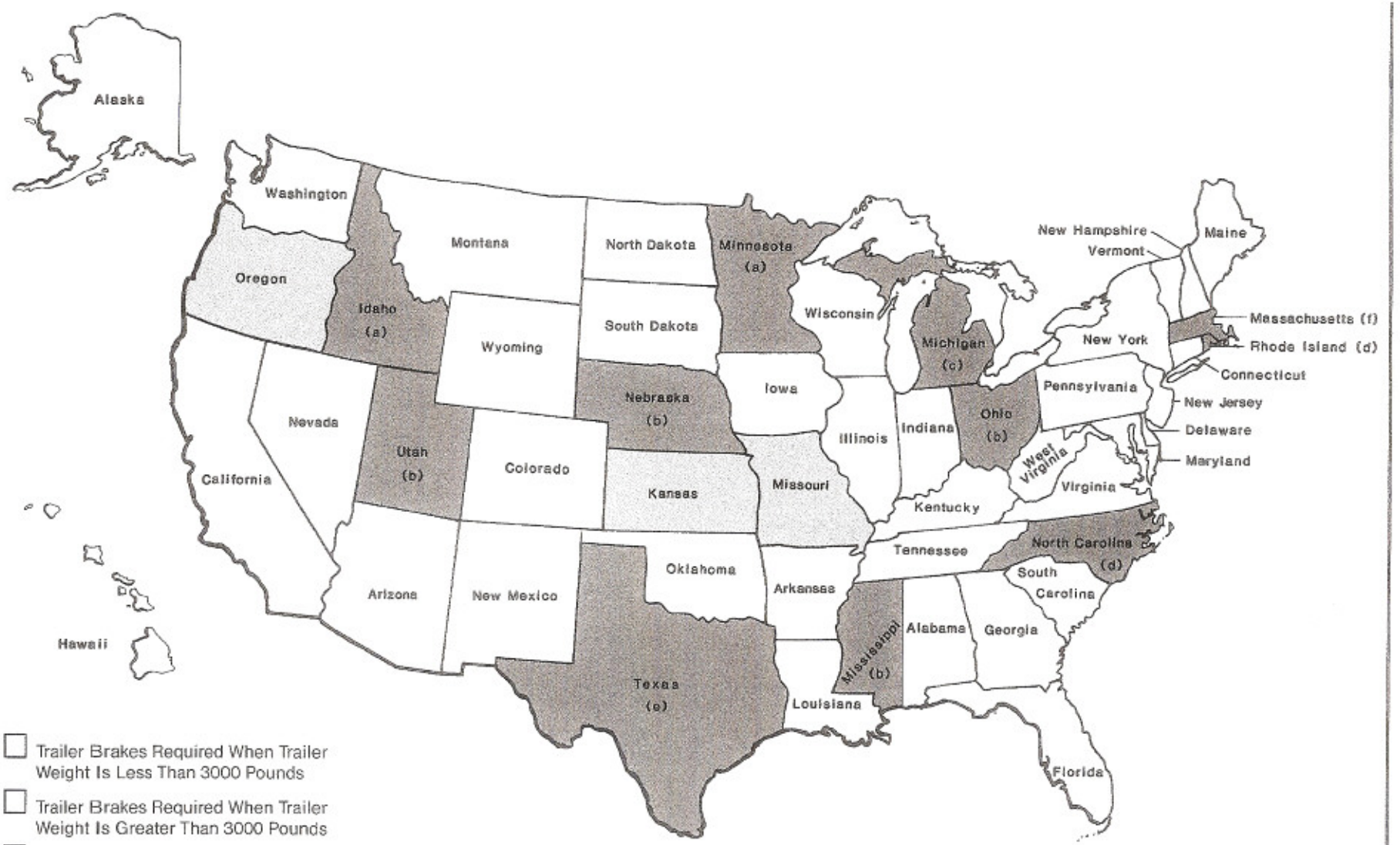
States With Towbar Requirements

States Without Towbar Requirements

No Towing Requirements Stated in State's Driver's Manual

Towing Requirements Stated in State's Driver's Manual

Chart 3: Towing Requirements in State Driver's Manual



- Trailer Brakes Required When Trailer Weight Is Less Than 3000 Pounds
- Trailer Brakes Required When Trailer Weight Is Greater Than 3000 Pounds
- Trailer Brakes Are Not Required
- Trailer Brakes Are Required When Trailer Weight Is Greater Than:
  - a) 1500 Pounds
  - b) 2000 Pounds
  - c) 3300 Pounds
  - d) 4000 Pounds
  - e) 4500 Pounds
  - f) 10,000 Pounds

Chart 5: Trailer Brake Requirements

turing error, its casing can be electrically charged by full-line voltage. This product contains a defect as a result of manufacturing or production error.

(b) Shoes labeled and marketed for long-distance running are so designed that they might cause or contribute to the causing of muscle or tendon injury if used for long-distance running. The shoes are defective due to the labeling and marketing.

(c) A kite made of electrically conductive material presents a risk of electrocution if it is long enough to become entangled in power lines and be within reach from the ground. The electrically conductive material contributes both to the beauty of the kite and the hazard it presents. The kite contains a design defect.

(d) A power tool is not accompanied by adequate instructions and safety warnings. Reasonably foreseeable consumer use or misuse, based in part on the lack of adequate instructions and safety warnings, could result in injury. Although there are no reports of injury, the product contains a defect because of the inadequate warnings and instructions.

(e) An exhaust fan for home garages is advertised as activating when carbon monoxide fumes reach a dangerous level but does not exhaust when fumes have reached the dangerous level. Although the cause of the failure to exhaust is not known, the exhaust fan is defective because users rely on the fan to remove the fumes and the fan does not do so.

However, not all products which present a risk of injury are defective. For example, a knife has a sharp blade and is capable of seriously injuring someone. This very sharpness, however, is necessary if the knife is to function adequately. The knife does not contain a defect insofar as the sharpness of its blade is concerned, despite its potential for causing injury, because the risk of injury is outweighed by the usefulness of the product which is made possible by the same aspect which presents the risk of injury. In determining whether the risk of injury associated with a product is the type of risk which will render the product defective, the Commission and staff will consider, as appropriate: The utility of the product involved; the nature of the risk of injury which the product presents; the necessity for the product; the population exposed to the product and its risk of injury; the Commission's own experience and expertise; the case law interpreting Federal and State public health and safety statutes; the case law in the area of products liability; and other factors relevant to the determination. If the information available to a subject firm does not reasonably support the conclusion that a defect exists, the subject firm need not report. However, if the information does reasonably support the conclusion that a defect exists, the subject firm must then consider whether that defect could create a substantial product hazard. (See 1115.12(f) for factors to be assessed in determining whether a substantial product hazard could exist.) If the subject firm determines that the defect could create a substantial product hazard, the subject firm must report to the Commission. Most defects could present a substantial product hazard if the public is exposed to significant numbers of defective products or if the possible injury is serious or is likely to occur. Since the extent of public exposure and/or the likelihood or seriousness of injury are ordinarily not known at the time a defect first manifests itself, subject firms are urged to report if in doubt as to whether a defect could present a substantial product hazard. On a case-by-case basis the Commission and the staff will determine whether a defect within the meaning of section 15 of the CPSA does, in fact, exist and whether that defect presents a substantial product hazard. Since a consumer product may be defective even if it is designed, manufactured, and marketed exactly as intended by a subject firm, subject firms should report if in doubt as to whether a defect exists. Defect as discussed in this section and as used by the Commission and staff, pertains only to interpreting and enforcing the Consumer Product Safety Act. The criteria and discussion in this section are not intended to apply to any other area of the law.

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