



U.S. Department  
of Transportation

Research and  
Special Programs  
Administration

400 Seventh Street, S.W.  
Washington, D.C. 20590

#### 49 CFR Parts 172, 173, 175

[Docket No. HM-173; Notice No. 81-4]

#### Requirements for Transportation of Wet Electric Storage Batteries

**AGENCY:** Materials Transportation  
Bureau (MTB), Research and Special  
Programs Administration, DOT.

**ACTION:** Notice of proposed rulemaking.

**SUMMARY:** This notice proposes to simplify, clarify and otherwise improve those requirements of the Hazardous Materials Regulations that pertain to the transportation of wet electric storage batteries ("wet cell batteries"). Specifically, it proposes (1) a revision of requirements applicable to the air transport of wheelchairs equipped with wet cell batteries, in order to enhance air transport safety and facilitate the travel of handicapped persons who use wheelchairs; (2) new test criteria which effectively define the term "nonspillable" as applied to wet cell batteries; and (3) new shipping names to distinguish between acid and alkaline corrosive battery fluids in order to aid emergency response efforts and to simplify shipping names and make them consistent with international shipping descriptions.

**DATE:** Comments must be received by August 3, 1981.

**ADDRESS:** Comments must be addressed to the Dockets Branch, Materials Transportation Bureau, U.S. Department of Transportation, Washington, D.C. 20590. Comments should identify the docket (Docket HM-173) and be submitted in five copies. The Dockets Branch is located in room 8426 of the Nassif Building, 400 Seventh Street, S.W., Washington, D.C. Public dockets may be reviewed between the hours 8:30 a.m. to 5 p.m., Monday through Friday.

**FOR FURTHER INFORMATION CONTACT:** Edward T. Mazzullo, Standards Division, Office of Hazardous Materials Regulation, Materials Transportation Bureau, Department of Transportation, 400 Seventh Street, S.W., Washington, D.C. 20590, (202) 426-2075.

**SUPPLEMENTARY INFORMATION:** On February 28, 1980, the MTB published a notice (Docket HM-173; Notice 80-4) in the *Federal Register* (45 FR 13153) which announced two public meetings and requested public comment concerning the need for revising those Hazardous Materials Regulations (HMR) which are

applicable to the transportation of wet electric storage batteries. Of particular concern was the development of standards for the safe transport on passenger-carrying aircraft of wheelchairs equipped with wet cell batteries. Proposals contained in this notice of proposed rulemaking are based on written comments received by the MTB, public input received at the two informal meetings (one on April 3, 1980, in Washington, DC, and the other on April 16, 1980, in Denver, Colorado) in response to Notice 80-4, and on the MTB's own rulemaking initiative. Specific proposals and background information are discussed by subject area in the following paragraphs.

#### I. Air transport of wheelchairs equipped with wet electric storage batteries (§§ 173.250, 175.10)

The HMR generally prohibit the carriage of wet cell batteries on passenger-carrying aircraft but there are two exceptions, in §§ 173.250(a) and 173.260(d), which permit their carriage when installed in self-propelled vehicles. Unfortunately, the provisions of these exceptions are not well known, are subject to misunderstanding and are considered inadequate with regard to achieving an acceptable level of safety. Inadequacies include lack of requirements with regard to packaging, hazard identification and carrier handling and operating procedures for battery equipped wheelchairs. Based on comments submitted in response to Notice 80-4, there is a need to prescribe requirements for securing batteries to wheelchairs, protecting them from short circuits, deactivating the wheelchairs and, in certain circumstances, for removing and packaging batteries separate from the wheelchairs. There also is a need for carrier operating requirements with regard to stowing wheelchairs in cargo compartments, stowing batteries away from other incompatible hazardous materials, and notifying pilots as to the locations of wheelchairs on aircraft. Interested persons should refer to Notice 80-4 for a more detailed discussion of some of the problems and issues involved in the transportation on passenger-carrying aircraft of wheelchairs equipped with wet cell batteries.

There are several alternatives pertaining to the transport of wheelchairs which were discussed in Notice 80-4, but which have not been

proposed herein because, based on comments received, they do not appear feasible. Briefly, they are:

1. *Battery housings.* Housings for batteries which are integral to wheelchairs, impervious to battery fluid and leaktight do not appear to be generally available at present.

2. *Nonspillable batteries.* It does not appear feasible, in terms of cost and energy efficiency, to require the use of nonspillable batteries at the present time. The MTB notes, however, that at least one battery manufacturer is in the process of marketing a nonspillable, gel-type, battery which may prove to be competitive with currently used "spillable" lead acid batteries.

3. *Additional packaging.* For batteries which remain installed in wheelchairs during transport, it may not be cost effective, or necessary from a safety standpoint, to prescribe packaging requirements. It would appear that if batteries are secured to wheelchairs and the wheelchairs are in turn secured upright in aircraft cargo compartments, then the risk of spillage of battery fluid is minimal. Under the stated conditions, adequate handling procedures may be all that are required in order to achieve an acceptable level of safety. Risks could be reduced further by use of spill-resistant vent caps, absorbent materials, taping fill caps or other means but these alternatives could be left to the discretion of shippers and carriers.

4. *Hazard Identification.* There does not appear to be a need, from a safety standpoint, to describe shipments involving wheelchairs on shipping papers. Further, due to the readily identifiable nature of a battery equipped wheelchair, requirements pertaining to hazard warning labels, orientation markings and shipping name markings appear necessary only in certain instances.

Several changes have been proposed in this notice to eliminate present misunderstandings and to achieve an improved level of safety regarding the transport of wheelchairs equipped with wet cell batteries. A new entry, "Battery, electric storage, wet, acid or alkaline, with wheelchair" would be added to the Hazardous Materials Table in § 172.101. Columns 5(a) and 5(b) would both reference §§ 173.250 and 175.10 as applicable sections for both packagings and exceptions. A "No limit" reference in column 6(a) would clarify that the units are permitted on passenger-carrying aircraft.

Section 173.250 would be revised for clarity. For other than transport on passenger-carrying aircraft, wet cell battery equipped wheelchairs would continue to be shipped subject to the minimal requirements of § 173.250 pertaining to securement and protection against short circuits. For transport on passenger-carrying aircraft, § 173.250 would reference § 175.10 as the applicable packaging section.

New requirements would be added in § 175.10 for transporting wheelchairs equipped with wet cell batteries on passenger-carrying aircraft. Wheelchairs equipped with nonspillable batteries would be transported subject only to requirements that the batteries be protected against short circuits and either be securely attached to the wheelchairs or be removed and boxed. This proposal represents a departure from requirements currently applicable to wheelchairs equipped with nonspillable batteries only to the extent that the batteries would not need to be boxed (or housed) if securely attached to wheelchairs.

For other than nonspillable batteries, it is proposed to permit batteries to be removed from wheelchairs to facilitate their shipment, but only on aircraft whose cargo compartment configurations cannot accommodate the upright loading or stowage of wheelchairs with batteries installed. In order to achieve an adequate level of safety, the batteries would be packaged in leaktight containers which have been rendered "tilt proof" either by securing them to pallets or by securing them upright in the cargo compartment using positive means of securement such as restraining straps. When so shipped, the outside containers would be marked to indicate upright orientation and with the shipping name "Battery, wet, acid or alkaline, with wheelchair" and would be labeled with CORROSIVE hazard warning labels. Use of absorbent material would be required as an inside packaging material. This proposal represents a relaxation of existing requirements which forbid the transport on passenger-carrying aircraft of "spillable" batteries, other than when such batteries remain installed in self-propelled vehicles. The change is believed necessary to facilitate the shipment of battery equipped wheelchairs in those situations where cargo compartment configurations do not permit upright loading and storage.

New provisions in § 175.33 would be added with regard to notifying the pilot-in-command, orally or in writing, as to the location on aircraft of any wheelchair equipped with batteries

(other than nonspillable batteries). This is similar to existing provisions for other hazardous materials which require written notification to the pilot. Provisions in §§ 175.78 and 175.79 would forbid the stowage of batteries in a position which might allow contact with flammable solids, oxidizing materials or organic peroxides and would require that batteries be secured upright in cargo compartments. For aircraft cargo compartment configurations that can accommodate upright loading and storage, new handling procedures, contained in § 175.10, would require that batteries remain installed in the wheelchairs, be securely attached to them and be protected against short circuits. Batteries would be disconnected from drive motors to prevent accidental activation of wheelchairs during shipment. Wheelchairs would be secured upright in cargo compartments by appropriate means. So as not to alter air carrier baggage handling procedures or require costly modifications to cargo compartments, the proposed provisions would not prescribe the means by which wheelchairs would be secured upright.

It is intended that these proposed changes will clarify requirements applicable to wheelchairs equipped with wet cell batteries and will enhance the safety of transporting them. In turn, the changes should facilitate the mobility of wheelchair users in reducing the reluctance of certain air carriers and pilots to transport these items and by permitting wheelchairs to be carried in a manner which is not presently permitted (i.e., with batteries removed) on certain aircraft.

## II. Defining "nonspillable" batteries (§§ 173.260(d), 175.10)

Electric storage batteries, which contain electrolyte or corrosive battery fluid and are "of the nonspillable type", are excepted by § 173.260(d) from all other regulatory requirements (such as packaging, labeling and description requirements) when the batteries are securely boxed and protected against short circuits. It has become apparent through reports of incidents, requests for interpretations and comments submitted to the MTB that there is a need to define the term "nonspillable" as that term is used in § 173.260.

In Notice 80-4 the MTB requested public comment pertaining to defining a nonspillable wet cell battery in terms of appropriate regulatory standards. The MTB suggested criteria for two tests, one involving vibration and the other involving altitude (pressure differentials). Commenters to the notice

were generally supportive of the MTB's suggested criteria. It would appear that these tests are a reasonable reflection of the demands imposed on batteries under conditions normally incident to transportation. Therefore, the tests are proposed to be added in § 173.260(d) as defining criteria for nonspillable batteries essentially in the form suggested in Notice 80-4, but with some editorial revision for the purpose of clarification.

## III. General revision of regulations applicable to wet electric storage batteries (§§ 172.101, 173.250)

A revision of proper shipping names in § 172.101 is proposed in order to distinguish, between acid and alkaline battery fluid for emergency response purposes and to simplify certain shipping names. For example, "Electrolyte (acid) battery fluid (*not over 47% acid*)" would become "Battery fluid, acid", and the terms "electric storage" would become optional in describing batteries. All shipping names for batteries and battery fluid would be located in one section of the Hazardous Materials Table. A new proper shipping name "Battery, *electric storage, dry (containing potassium hydroxide, dry, solid, flake, bead or granular)*" would be added to accommodate dry batteries containing dry potassium hydroxide, classed corrosive material. New shipping names would be added for batteries shipped with wheelchairs and for nonspillable batteries, in order to clarify requirements for those items. In addition, § 173.250 has been revised for clarity and to reference new provisions applicable to wheelchairs equipped with wet cell batteries.

These proposals do not represent the termination of MTB's review of regulations applicable to batteries. Additional changes, both substantive and editorial, may be proposed at a future date after the MTB completes its review.

In consideration of the foregoing, 49 CFR Parts 172, 173 and 175 would be amended as follows:

### PART 172—HAZARDOUS MATERIALS TABLES AND HAZARDOUS MATERIALS COMMUNICATIONS REGULATIONS

1. The Hazardous Materials Table in § 172.101 would be amended as follows:



**PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS**

2. In § 173.250, paragraph (a) would be revised, paragraph (b) would be redesignated paragraph (d), and new paragraphs (b) and (c) would be added, as follows:

**§ 173.250 Automobiles, other self-propelled vehicles, engines or other mechanical apparatus.**

(a) Except as provided in paragraph (b) of this section, automobiles and other self-propelled vehicles equipped with wet electric storage batteries are excepted from all other requirements of this subchapter when shipped as prescribed in subparagraphs (1) or (2) of this paragraph, unless other hazardous materials are transported on the self-propelled vehicles, in which instance the regulations covering these other materials apply.

(1) When batteries are removed from the self-propelled vehicles and loaded in the transport vehicle therewith, the batteries must be so loaded, blocked and braced as to prevent short circuits, spillage of battery fluid or movement within the transport vehicle.

(2) When batteries are installed in self-propelled vehicles they must be completely protected against short circuits and so secured that spillage of battery fluid will not occur under conditions normal to transportation.

(b) For transportation by passenger-carrying aircraft, wheelchairs equipped with wet electric storage batteries must be shipped as prescribed in § 175.10 of this subchapter.

(c) When wet electric storage batteries or batteries packed in containers with battery fluid are shipped as part of carload or truckload shipments of automobile parts or assembly materials, they are subject to no other requirements of this subchapter when the batteries and battery fluid are boxed or crated and so loaded, blocked and braced as to prevent short circuits of the batteries, spillage of battery fluid and movement of the materials in the transport vehicle under conditions normal to transportation. When other hazardous materials are included in the shipments, the regulations covering these other materials apply.

3. In § 173.260, paragraph (d) would be revised to read as follows:

**§ 173.260 Electric storage batteries, wet.**

(d) Nonspillable wet electric storage batteries capable of withstanding the tests prescribed in (1) and (2) of this paragraph without leakage of battery

fluid are excepted from all other requirements of this subchapter when protected against short circuits and securely packaged so as to withstand conditions normal to transportation.

(1) *Vibration test.* Battery is rigidly clamped to the platform of a vibration machine and a simple harmonic motion having an amplitude of 0.03 inches (0.06 inches maximum total excursion) is applied. The frequency is varied at the rate of one cycle per second per minute between the limits of 10 to 55 cycles per second. The entire range of frequencies and return is traversed in 95±5 minutes for each mounting position (direction of vibration) of the battery. The battery must be vibrated in three mutually perpendicular directions, one of which must be with the terminal face of the battery inverted, for equal time periods.

(2) *Pressure differential test.* Following the vibration test, the battery is stored for six hours at 78°F. ± 7°F. under an external partial pressure of 2 pounds per square inch absolute. The battery must be tested in three mutually perpendicular positions, one of which must be with the terminal face of the battery inverted, for at least six hours in each position.

**PART 175—CARRIAGE BY AIRCRAFT**

4. In § 175.10, paragraph (b) would be added to read as follows:

**§ 175.10 Exceptions.**

(b) Wheelchairs equipped with wet electric storage batteries may be carried in cargo compartments on passenger-carrying aircraft when transported in accordance with the provisions of (1), (2) and (3) of this paragraph. Shipments are subject to no other requirements of this subchapter except those requirements in §§ 175.33, 175.78 and 175.79 which are applicable to batteries.

(1) Wheelchairs equipped with batteries of a nonspillable type, as defined in § 173.260(d) of this subchapter, may be transported subject to no other requirements of this subchapter provided the batteries are:

(i) Protected against short circuits, and

(ii) Securely attached to the wheelchairs or removed and boxed.

(2) For carriage on aircraft in cargo compartments which can accommodate upright loading and stowage of wheelchairs, the wheelchairs must be transported as follows:

(i) Batteries must remain installed on wheelchairs, be securely attached to them, and terminals must be protected against short circuits;

(ii) Wheelchairs must be deactivated by removing connections at battery

terminals or by otherwise disconnecting the power source, and

(iii) Wheelchairs must be secured upright in cargo compartments.

(3) For carriage on aircraft in cargo compartments which cannot accommodate upright loading or storage of wheelchairs, batteries may be removed from wheelchairs and carried in strong outside containers, as follows:

(i) Outside containers must be leaktight, impervious to battery fluid, and rendered tilt proof by securing to pallets or by securing in cargo compartments using restraining straps, brackets, or holders;

(ii) Batteries must be protected against short circuits, secured upright in the outside containers and surrounded by absorbent material sufficient to absorb their total liquid contents, and

(iii) Outside containers must be marked to indicate proper orientation, be marked "Battery, wet, with wheelchair", and be labeled with CORROSIVE labels (§ 172.442 of this subchapter).

Note.—It is recommended that batteries which are not nonspillable be fitted with spill resistant vent caps when feasible.

4. In § 175.83, paragraph (b) would be added to read as follows:

**§ 175.83 Notification of pilot-in-command.**

(b) When wheelchairs equipped with wet electric storage batteries, other than nonspillable batteries, are transported under the provisions of § 175.10(b)(2) or (b)(3) of this subchapter, the pilot-in-command shall be notified before takeoff as to their location in the aircraft.

5. In § 175.78, paragraph (a) would be revised to read as follows:

**§ 175.78 Stowage compatibility of cargo.**

(a) No person may stow a package, or a wet electric storage battery other than a nonspillable battery, containing a corrosive material on an aircraft next to or in a position that will allow contact with a package of flammable solids, oxidizing materials, or organic peroxides.

6. § 175.79 would be revised to read as follows:

**§ 175.79 Orientation of cargo.**

(a) A package, or a wet electric storage battery other than a nonspillable battery, containing hazardous materials and marked "THIS SIDE UP", "THIS END UP", or with arrows to indicate proper orientation, must be loaded and stored aboard an aircraft in accordance with such markings and secured in a

manner that will prevent any movement that would change the orientation of the package or battery.

(b) A package, or a wet electric storage battery other than a nonspillable battery, containing liquid hazardous material and not marked as indicated in paragraph (a) of this section must be loaded and stored with closures up and secured as prescribed in paragraph (a) of this section.

(49 U.S.C. 1803, 1804, 1808; 49 CFR 1.53, App. A to Part 1, and paragraph (a)(4) of App. A Part 106.)

**Note.**—The Materials Transportation Bureau has determined that this document will not result in a "major rule" under the terms of Executive Order 12291 and DOT procedures (44 FR 11034) nor require an environmental impact statement under the National Environmental Policy Act (49 U.S.C. 4321 et. seq.). Based on limited information available concerning size and nature of entities likely to be affected by this proposal, I certify that this proposal will not, if promulgated, have a significant economic impact on a substantial number of small entities. This proposal will not affect not-for-profit enterprises or small governmental jurisdictions. Small businesses potentially affected include air carriers and storage battery manufacturers and shippers. The economic impact on such small entities will be minimal. A regulatory evaluation and environmental assessment are available for review in the Docket.

Issued in Washington, D.C., on May 29, 1981.

**Alan I. Roberts,**

*Associate Director for Hazardous Materials Regulation, Materials Transportation Bureau.*

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