

§ 174.315

identify the condition in which the vessel is least stable, including, but not limited to, the most severe loading condition, and the:

(1) Specific gravity of the dredge spoil, from 1.02 up to and including the maximum required by paragraph (e)(1) of this section; and

(2) Draft, up to and including the draft corresponding to the working freeboard for the full range of trim.

(d) The calculations required by this section for a dredge with open hoppers may include spillage of spoil from the hopper resulting from changing the angle of heel and trim.

(e) The following assumptions must be made when doing the calculations required by this section:

(1) Dredged spoil in the hopper is a homogeneous liquid with a maximum specific gravity for the areas of operation.

(2) When calculating the vessel's righting arm, it is assumed at each angle of heel that the vessel trims free and the trimming moment is zero.

TABLE 174.310—PERMEABILITY OF FLOODABLE SPACES

Spaces and tanks	Permeability
Storerooms	0.60
Accommodation spaces	0.95
Consumable liquid tanks	0.00 or 0.95—whichever results in the more disabling condition.
Machinery space	0.85—unless otherwise supported by calculations.
Cargo tanks	Determined from the actual density and amount of liquid carried in the tank.

§ 174.315 **Extent and character of damage.**

(a) The calculations required by §174.310 must show that the dredge can survive damage at any location along the length of the vessel including at a transverse bulkhead in accordance with paragraph (b) of this section.

(b) The calculations required by paragraph (a) of this section must assume the most disabling side penetration with the damage collision penetration provided by Table 174.315, except that if the most disabling damage collision penetrations would be less than those provided by Table 174.315, the smaller damage collision penetration must be assumed.

TABLE 174.315—EXTENT OF DAMAGE COLLISION PENETRATION

Longitudinal extent	0.495L ^{2/3} or 47.6 feet. [(1/3)(L) ^{2/3} or 14.5 meters] whichever is less.
Transverse extent ¹	B/5 or 37.7 feet. (11.5 meters), whichever is less.
Vertical extent	From the base line upward without limit.

¹Damage applied inboard from the vessel's side at a right angle to the centerline at the draft corresponding to the working freeboard assigned under subchapter E of this chapter.

§ 174.320 **Damage survival.**

A hopper dredge survives assumed damage if it meets the following conditions:

(a) The maximum angle of heel in each stage of flooding must not exceed 30 degrees or the angle of downflooding whichever is less.

(b) The final waterline, taking into account sinkage, heel, and trim, must be below the lowest edge of each opening through which progressive flooding may take place.

(c) The righting arm curve calculated after damage must:

(1) Have a minimum positive range of 20 degrees beyond the angle of equilibrium; and

(2) Reach a height of at least 4 inches (100mm) within the 20 degree positive range.

(d) Each opening within, or partially within, the 20 degree range beyond the angle of equilibrium must be weather-tight.

(e) After flooding or equalization as allowed by §174.325, the hopper dredge's metacentric height must be at least 2 inches (50mm) when the dredge is in an upright position.

§ 174.325 **Equalization.**

When doing the calculations required by §174.310 of this subpart—

(a) Equalization arrangements requiring mechanical aids, such as valves, may not be assumed to be effective in reducing the angle of heel; and

(b) Spaces joined by ducts may be assumed to be common spaces only if equalization takes place within 15 minutes after flooding begins.