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operation of any vital system or systems.

(b)(1) Except as provided in paragraphs (b)(2) and (b)(3) of this section, primary control, alternate control, safety control, and alarm and instrumentation systems for any vital system must be independent of each other.

(2) Independent sensors are not required except that sensors for primary speed, pitch, or direction of rotation control in closed loop propulsion control systems must be independent and physically separate from required safety control, alarm, or instrumentation sensors.

(3) The safety trip control of § 62.35–5(b)(2) must be independent and physically separate from all other systems.

(c) Two independent sources of power must be provided for all primary control, safety control, instrumentation and alarm systems. Failure of the normal source of power must actuate an alarm in the machinery spaces. One source must be from the emergency power source (see part 112 of this chapter, Emergency Lighting and Power Systems) unless one of the sources is—

(1) Derived from the power supply of the system being controlled or monitored;

(2) A power take-off of that system; of

(3) An independent power source equivalent to the emergency power source.

§ 62.30–10 Testing.

(a) Automated vital systems must be tested in accordance with subpart 61.40 of this chapter.

(b) On-line built-in test equipment must not lock out or override safety trip control systems. This equipment must indicate when it is active.

Subpart 62.35—Requirements for Specific Types of Automated Vital Systems

§ 62.35–1 General.

(a) Minimum instrumentation, alarms, and safety controls required for specific types of automated vital systems are listed in Table 62.35–50.

(b) Automatic propulsion systems, automated electric power management systems, and all associated subsystems and equipment must be capable of meeting load demands from standby to full system rated load, under steady state and maneuvering conditions, without need for manual adjustment or manipulation.

§ 62.35–5 Remote propulsion-control systems.

(a) *Manual propulsion control.* All vessels having remote propulsion control from the navigating bridge, an ECC or maneuvering platform, or elsewhere must have a manual alternate propulsion control located at the equipment.

NOTE: Separate local control locations may be provided for each independent propeller.

(b) *Centralized propulsion control equipment.* Navigating bridge, ECC, maneuvering platform, and manual alternate control locations must include—

(1) Control of the speed and direction of thrust for each independent propeller controlled;

(2) A guarded manually actuated safety trip control (which stops the propelling machinery) for each independent propeller controlled;

(3) Shaft speed and thrust direction indicators for each independent propeller controlled;

(4) The means to pass propulsion orders required by § 113.30–5 and § 113.35–3 of this chapter; and

(5) The means required by paragraph (d) of this section to achieve control location transfer and independence.

(c) *Main navigating bridge propulsion control.* (1) Navigating bridge remote propulsion control must be performed by a single control device for each independent propeller. Control must include automatic performance of all associated services, and must not permit rate of movement of the control device to overload the propulsion machinery.

(2) On vessels propelled by steam turbines, the navigation bridge primary control system must include safety limit controls for high and low boiler water levels and low steam pressure. Actuation of these limits must be alarmed on the navigating bridge and at the maneuvering platform or ECC.

(3) On vessels propelled by internal combustion engines, an alarm must annunciate on the navigating bridge and at the maneuvering platform or ECC, if