physical damage by an approved means. This protection shall not be required to be raceways.

(H) Number of Supply Interconnections. Where connectors are used in a supply conductor, there shall be a maximum number of three interconnections (mated connector pairs) where the total length from supply to switchboard does not exceed 30 m (100 ft). In cases where the total length from supply to switchboard exceeds 30 m (100 ft), one additional interconnection shall be permitted for each additional 30 m (100 ft) of supply conductor.

Excessive numbers of interconnections could jeopardize the mechanical and electrical integrity of the supply conductors.

(I) Single-Pole Separable Connectors. Where single-pole portable cable connectors are used, they shall be listed and of the locking type. Sections 406.7 and 406.8 shall not apply to listed single-pole separable connectors and single-conductor cable assemblies utilizing listed single-pole separable connectors.

(J) Supply Neutral Conductor. Supply neutral conductors shall comply with 520.54(J)(1) and (J)(2).

(1) Marking. Grounded neutral conductors shall be permitted to be identified by marking at least the first 150 mm (6 in.) from both ends of each length of conductor with white or gray.

(2) Conductor Sizing. Where single-conductor feeder cables not installed in raceways are used on multiphase circuits feeding portable stage switchboards containing solid-state phase-control dimmers, the grounded neutral conductor shall have an ampacity of at least 130 percent of the ungrounded circuit conductors feeding the portable stage switchboard. Where such feeders are supplying only solid-state sine wave dimmers, the grounded neutral conductor shall have an ampacity of at least 100 percent of the ungrounded circuit conductors feeding the portable stage switchboard.

Three-phase, 4-wire switchboards that contain solid-state phase-control dimming devices must, when connected to a 3-phase, 4-wire supply, be connected to that supply with a multiconductor cable sized by counting the neutral as a current-carrying conductor or with a set of single-conductor cables where the neutral is sized at 130 percent of the ungrounded conductors.

Solid-state sine-wave dimmers are linear devices that do not add nonlinear loads to the neutral conductor. Where feeders supply solid-state sine-wave dimmers, the neutral conductor is sized by considering it a non–current-carrying conductor. However, it must have an ampacity of at least 100 percent of the ampacity of the phase conductors.

(K) Qualified Persons. The routing of portable supply conductors, the making and breaking of supply connectors and other supply connections, and the energization and de-energization of supply services shall be performed by qualified persons, and portable switchboards shall be so marked, indicating this requirement in a permanent and conspicuous manner.

Exception: A portable switchboard shall be permitted to be connected to a permanently installed supply receptacle by other than qualified persons provided that the supply receptacle is protected for its current rating by an overcurrent device of not greater than 150 amperes, and where the receptacle, interconnection, and switchboard comply with all of the following:

(1) They employ listed multipole connectors for every supply interconnection.
(2) They prevent access to all supply connections by the general public.
(3) They employ listed extra-hard usage multiconductor cords or cables with an ampacity not less than the load and not less than the ampere rating of the connectors.

This requirement divides the acceptable practices and requirements for professional and professional-grade educational venues (qualified) from those for amateur or amateur-grade educational venues (other than qualified). The requirements allow for such things as single-conductor feeder systems, feeders sized for the current-connected load, tap rules, and so forth, and require the services of a qualified person. The exception provides for a conventional feeder system suitable for use by an untrained person.

Part V. Portable Stage Equipment Other Than Switchboards

520.61 Arc Lamps. Arc lamps, including enclosed arc lamps and associated ballasts, shall be listed. Interconnecting cord sets and interconnecting cords and cables shall be extra-hard usage type and listed.

520.62 Portable Power Distribution Units. Portable power distribution units shall comply with the requirements of 520.62(A) and (B).

N **(A) Listing.** Portable power distribution units shall be listed.

(B) Single-Conductor Feeder Systems. Portable power distribution equipment fed by single-conductor feeder systems shall comply with the requirements of 520.53(C) and (D) and 520.54.

520.63 Bracket Fixture Wiring.

(A) Bracket Wiring. Brackets for use on scenery shall be wired internally, and the fixture stem shall be carried through to the back of the scenery where a bushing shall be placed on the end of the stem. Externally wired brackets or other fixtures shall be permitted where wired with cords designed for hard usage that extend through scenery and without joint or splice in canopy of fixture back and terminate in an approved-type stage connector located, where practical, within 450 mm (18 in.) of the fixture.

(B) Mounting. Fixtures shall be securely fastened in place.