panel. Its purpose is to break down larger dimmer circuits to smaller branch circuits, to select the branch circuits to be controlled by a dimmer, or both.

(D) Constant Power. A stage switchboard containing only overcurrent protective devices and no control elements.

520.27 Stage Switchboard Feeders.

(A) Type of Feeder. Feeders supplying stage switchboards shall be one of the types in 520.27(A)(1) through (A)(3).

(1) Single Feeder. A single feeder disconnected by a single disconnect device.

(2) Multiple Feeders to Intermediate Stage Switchboard (Patch Panel). Multiple feeders of unlimited quantity shall be permitted, provided that all multiple feeders are part of a single system. Where combined, neutral conductors in a given raceway shall be of sufficient ampacity to carry the maximum unbalanced current supplied by multiple feeder conductors in the same raceway, but they need not be greater than the ampacity of the neutral conductor supplying the primary stage switchboard. Parallel neutral conductors shall comply with 310.10(G).

Stage switchboard feeders are often many dimmer-controlled circuits at 100 amperes or less, single phase, so they can be distributed to different combinations of the same size or smaller branch circuits. This type of installation usually requires a common neutral, and because of the quantity of circuits, many installations require several parallel neutrals running in several raceways. Generally, these parallel neutrals are sized as follows: (1) size the common neutral to the feeder of the primary switchboard, then (2) split the neutral into multiple parallel conductors, one per raceway. In no case are the ungrounded conductors permitted to be installed in one raceway and the common neutral installed in another.

(3) Separate Feeders to Single Primary Stage Switchboard (Dimmer Bank). Installations with separate feeders to a single primary stage switchboard shall have a disconnecting means for each feeder. The primary stage switchboard shall have a permanent and obvious label stating the number and location of disconnecting means. If the disconnecting means are located in more than one distribution switchboard, the primary stage switchboard shall be provided with barriers to correspond with these multiple locations.

Large primary stage switchboards usually consist of several sections, often called dimmer racks, that form a dimmer bank. The dimmer racks can be fed separately or bused together to accept one or more feeder circuits. In older theaters where an intermediate stage switchboard is connected to a primary stage switchboard, a single large feeder usually supplies the primary stage switchboard, because the intermediate stage switchboard patches only the ungrounded conductors and requires a common neutral.

(B) Neutral Conductor. For the purpose of ampacity adjustment, the following shall apply:

(1) The neutral conductor of feeders supplying solid-state, phase-control 3-phase, 4-wire dimming systems shall be considered a current-carrying conductor.
(2) The neutral conductor of feeders supplying solid-state, sine wave 3-phase, 4-wire dimming systems shall not be considered a current-carrying conductor.
(3) The neutral conductor of feeders supplying systems that use or are capable of using both phase-control and sine wave dimmers shall be considered as current-carrying.

The neutral is not always considered a current-carrying conductor with the use of solid-state dimmers. If the sine wave–type dimmer is the only type in use, the neutral of the circuits supplying it need not be considered a current-carrying conductor. However, if phase-control dimmers are used, or if combinations of phase control– and sine wave–type dimmers are connected to the same feeder or branch circuit, the neutral conductor must be considered a current-carrying conductor. The neutral of feeders supplying solid-state, 3-phase, 4-wire dimming systems carries triplen-harmonic currents that are present even under balanced load conditions.

Δ **(C) Supply Capacity.** For the purposes of calculating supply capacity to switchboards, considering the maximum load that the switchboard is intended to control in a given installation shall be permitted if the following apply:

(1) All feeders supplying the switchboard shall be protected by an overcurrent device with a rating not greater than the ampacity of the feeder.
(2) The opening of the overcurrent device shall not affect the proper operation of the egress or emergency lighting systems.

Informational Note: See 220.40 for calculation of stage switchboard feeder loads.

Part III. Fixed Stage Equipment Other Than Switchboards

520.40 Stage Lighting Hoists. Where a stage lighting hoist is listed as a complete assembly and contains an integral cable-handling system and cable to connect a moving wiring device to a fixed junction box for connection to permanent wiring, the extra-hard usage requirement of 520.44(C)(1) shall not apply.

A listed stage lighting hoist, such as the one shown in Exhibit 520.3, is part of the rigging system. It provides an automated system — as opposed to a manual counterweight system — for lifting and supporting heavy integrated lighting equipment over a stage.

520.41 Circuit Loads.

(A) Circuits Rated 20 Amperes or Less. Footlights, border lights, and proscenium sidelights shall be arranged so that no