

TEXAS UTILITIES GENERATING COMPANY
AGENT FOR
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

COMANCHE PEAK STEAM ELECTRIC STATION
UNIT NOS. 1 & 2

DESIGN PROCEDURE: DP-1
SEISMIC CATEGORY I
ELECTRICAL CABLE TRAY SUPPORTS
JUNE 11, 1984

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1.0 SCOPE OF WORK

This document covers the procedures used in the design of Seismic Category I Electrical Cable Tray Support Systems for the Comanche Peak Steam Electric Station. These support systems under consideration are located in the Reactor, Safeguards, Auxiliary, Electrical Control, Fuel, Service Water Intake Structure and Diesel Generator Buildings.

2.0 RESPONSIBILITIES

Close coordination between the Electrical and Structural disciplines is required to achieve adequate design of the support systems. Responsibilities of these two disciplines are divided as follows:

2.1 ELECTRICAL DISCIPLINE

- a. Select cable trays
- b. Prepare cable tray layout drawings.
- c. Determine combined enveloping tray and cable weights.

2.2 STRUCTURAL DISCIPLINE

- a. Establish specification requirements for Vendors' seismic qualification to ensure that the cable trays under specified loading, are capable of withstanding the loads induced by SSE without loss of function.
- b. Review and evaluate tray seismic qualification reports submitted by the vendor for compliance with specification requirements.
- c. Incorporate cable tray supports on the structural drawings based on the electrical tray raceway drawings.
- d. Check all tray supports for interferences, with other components and revise as required.
- e. Select structural materials and shapes for the support structures.
- f. Develop generic support configurations for general plant use to suit building and tray geometric requirements. Develop special supports as required where use of generics is not appropriate.

- g. The support configuration is selected by the engineers to suit the specific tray layout.
- h. Perform analysis and design of the cable tray support structures and their wall/ceiling interface connection details.

3.0 DESCRIPTION OF SUPPORT SYSTEM

3.1 DESCRIPTION

The cable tray support system consists of the cable tray, vertical and horizontal support members, bracing members and the connections to building structures. The cable tray support system is designed to withstand the combined effects of all loads imposed on the system.

3.2 SUPPORT CATEGORIES

Cable tray supports used for the Comanche Peak Steam Electric Station are divided into the following two categories:

- a. Generic supports: Generic Supports are supports designed for typical geometry and worst envelope loading conditions for use throughout the plant.
- b. Special Supports: Special Supports are supports designed for particular geometry and loading conditions.

4.0 DESIGN AND DOCUMENTATION

4.1 DESIGN

Load combinations for the analysis and design of the cable tray supports are in accordance with the applicable sections of the FSAR. The design of the support structural members are in accordance with the applicable requirements of AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings."

4.2 DOCUMENTATION

4.2.1 DRAWINGS

- a. The cable tray support span, location and detail identification are shown on the structural cable tray support outline drawings, i.e. 2323-E1 (or E2) - XXX -S drawing series. The XXX is a 500 series drawing for the Reactor Building, a 600 series drawing for the Safeguards Building, a 700 series drawing for the Auxiliary and Safeguards Building and a 800 series drawing for the Fuel Building.
- b. The generic cable tray support details are shown on the structural cable tray support detail drawings 2323-S-0900 series. Drawing 2323-S-0901 shows the generic regular cable tray supports, drawing 2323-S-0902 shows the generic longitudinal cable tray supports and drawing 2323-S-0903 shows the generic regular and multi-directional cable tray supports. Special cable tray support details are shown on the support detail drawings or the support outline drawings.
- c. The support connection details at the wall/ceiling interface are shown on the following drawings:

Drawings 2323-S-0902; 0903; 0908; 0909 and 0929 for connection details using Hilti expansion bolts and/or Richmond Screw inserts.

Drawings 2323-S-0919 and 0920 for connections attached directly to embedded strip plates.

Drawings 2323-S-0923 thru 0926 inclusive for connections attached directly to large steel plates.
- d. Each cable tray support as defined in the support outline drawing is identified, in a rectangular box next to the support, the support type, the height and the width of the support frame and other pertinent information. The following are examples of how the supports are identified:

EXAMPLE 1:

A_1	:	$L = 3'-0"$
h	:	$2'-2"$

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This represents a generic regular cable tray support Case A₁ having a frame width of 3'-0" and a frame height of 2'-2". This detail is shown on the structural cable tray support detail drawing 2323-S-0901:

EXAMPLE 2: $L-B_2 : L = 3'-6"$
 $h_1 = 5'-0"$, $h_2 = 3'-8"$
 $l = 2'-4"$

This represents a generic longitudinal cable tray support case L-B₂ having a frame width of 3'-6" and a frame height of 5'-0" with intermediate beams located at 3'-8" and 2'-4" from ceiling. This detail is shown on the structural cable tray support detail drawing 2323-S-0902:

EXAMPLE 3: Det. "20" (S-0904)
 $L = 4'-0"$, $h_1 = 6'-0"$
 $h_2 = 4'-8"$, $h_3 = 3'-4"$

This represents a special cable tray support detail "20" shown on structural cable tray support detail drawing 2323-S-0904. The width of the frame is 4'-0" and the height is 6'-0" with intermediate beams located at 4'-8" and 3'-4" from ceiling.

4.2.2. CALCULATIONS

Design calculations are prepared for cable tray support structures and filed in books identified by the letters, SCS, a hyphen, followed by the three numerical numbers and end with the letter, C (for example, SCS-101C). The calculations are organized into the following six categories:

a. Criteria

Criteria calculations are shown in calculation book SCS-101C, Set 5.

b. Generic Cable Tray Supports

b.1 Calculations for the generic regular cable tray supports as shown on drawing 2323-S-0901 are given in;

Calculation Book: SCS-101C, Set 1

Computer Analyses: DMI-5P; DMI-11C, Set 3 and DMI-16P4

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- b.2 Calculations for the generic longitudinal cable tray supports as shown on drawing 2323-S -0902 are given in;

Calculation Book: SCS-101C, Set 2
Computer Analyses: DMI-5P

- b.3 Calculations for the generic regular and multi-directional cable tray supports as shown on drawing 2323-S-0903 are given in;

Calculation book: SCS-101C, Set 3.

c. Special Cable Tray Supports

Calculations for the special cable tray supports are sorted by their referenced cable tray support outline drawings. Calculation book number and set number are assigned to each cable tray support outline drawing containing special cable tray supports. For example; Calculations for the special cable tray supports as shown on drawing 2323-E1-0500-01-S are given in calculation book SCS-103C, Set 1. The Structural Department Calculation Master Index lists all the calculation books corresponding to the cable tray support outline drawings.

d. Connections

Connection calculations are shown in the following calculation books:

Allowable loads for Hilti expansion bolts and Richmond inserts: SCS-101C, Set 5

Allowable loads on embedded strip plates: SCS-111C, Set 1.

Allowable loads on large steel plates: SCS-111C, Set 7

Connection details attached to embedded strip plates as shown on drawings 2323-S-0919 and 0920: SCS-113C, Sets 1 & 2

Connection details attached to large steel plates as shown on drawings 2323-S-0923 thru 0926 inclusive: SCS-113C, Sets 3 thru 7.

e. CMCs and DCAs

Calculations for the CMCs and DCAs are listed in the CMC and DCA Master Indexes.

f. Miscellaneous

Calculations for the miscellaneous items on cable tray supports are identified by topics as follows:

Weld undersize: SCS-125C and SCS-146C books 1 & 2

Weld undercut: SCS-145C and SCS-147C.

4.2.3 DESIGN CHANGES

Design Changes may be implemented by drawing revision, DE/CD revision and CMC or DCA revision and are prepared in accordance with Section 5.0, Revisions.

4.3 DOCUMENT CONTROL

4.3.1 CALCULATIONS

Preparation and checking of technical calculations are performed in accordance with G&H Project Procedures Manual Design Control Procedure DC-7.

4.3.2 DRAWINGS

Preparation and checking of drawings are performed in accordance with G&H Project Procedures Manual Design Control Procedure DC-3.

4.3.3 DESIGN REVIEW

Design review of calculations and drawings are performed in accordance with G&H Project Procedures Manual Design Control Procedure DC-8.

5.0 REVISIONS

During the course of the project, modifications and/or changes are needed to be made to the Category I cable

tray support structural drawings which have been released for construction. One of the following three methods is used for these revisions:

5.1 DRAWING REVISION

Modifications may be incorporated into the appropriate drawing. The procedure for revising the drawing and the associated calculations are the same as that for the original issue of the documents as outlined in G&H Project Procedures Manual DC-3 and DC-7, respectively.

5.2 DE/CD REVISION

In lieu of revising the design drawing, a DE/CD (Design/Engineering Change/Deviation) may be prepared and issued. The field will then prepare a DCA (Design Change Authorization) or CMC (Component Modification Card) using the design change information on the DE/CD and initiate the necessary action to implement the change.

5.3 DCA AND CMC REVISIONS

Revisions to engineering drawings may be initiated by authorized field personnel after the official release of the engineering drawing for construction. The revision is accomplished by issuing Design Change Authorizations (DCAs) or Component Modification Cards (CMCs) in accordance with site procedures.

6.0 REVIEW

Drawings and Calculations are reviewed in accordance with Section 4.3.3 Design Review. Site generated design change documents (DCAs/CMCs) and their associated calculations are required to be reviewed by the G&H NY - based design change review team or the CPSES site - based design change review team. Design reviewers are members of the team who have not contributed to the field change and have been formally authorized by G&H NY to review the field changes shown on the DCA/CMC.