



***Society of Cable
Telecommunications
Engineers***

**ENGINEERING COMMITTEE
Energy Management Subcommittee**

SCTE OPERATIONAL PRACTICE

SCTE 229 2016

Operational Practice for Cable Facility Design Process

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1. Introduction

1.1. Executive Summary

This Operational Practice for Cable Facility Design Process is intended to provide the reader with a comprehensive context in which to consider and decide on the design of a new cable facility and of a modification of an existing facility. Further, this OP describes a process of activities that, if followed, will allow the development of a design that optimally addresses the following criteria:

1. Cable Operator's services to be supported and delivered to customers
2. Immediate and future accommodation of network elements
3. Physical size, electrical capacity, and cooling capacity
4. Geographic location
5. Type and cost of potential failure modes
6. Prevailing regulatory and code requirements
7. Capital and operating costs
8. Capital and operating budgets
9. Prevailing corporate policies

Implicit in the resulting design will be specific types and configurations of physical, electrical and mechanical infrastructure chosen to achieve a designated level of availability of such infrastructure to support delivery of services to customers. As such, this OP can be considered a companion to the SCTE Standard EMS-025, which specifies certain of the criteria noted above. As well, the resulting facility design will be characterized by its conformance to the SCTE Standard EMS-025.

This OP describes each criteria noted above in terms of specific activities comprising the process. Each activity is characterized as one or more questions about the facility which must be answered in order to realize an optimal design for the facility.

1.2. Scope

This document addresses the design of cable facilities that house inside plant equipment which is part of the network through which services are delivered to customers.

It is noted that a single building may include both technical and non-technical facilities. Non-technical facilities would include, for example, general office, warehouse, technical operations, and customer service counters. The Operational Practice for Cable Facility Design Process does not address the design on non-technical spaces, however the fundamental OP described in this document can be applied to non-technical spaces. And, for facilities that include both technical and non-technical facilities, the design of the entire facility is best conducted using the Operational Practice for Cable Facility Design Process, given that the technical facility component demands higher standards of design and construction, and is most immediately important to the delivery of services.

1.3. Benefits

Through the application of the Operational Practice for Cable Facility Design Process, the cable operator can best realize improved ability to remain competitive, particularly with respect to non-facilities-based service providers, by being able to deploy new and more attractive services/products to existing and new customers as a result of having well-designed, capable cable facilities in place that support, not hinder, the installation of network equipment in support of such services.

With respect to any given cable facility designed under this OP, the cable operator can expect to realize benefits:

- In the short-term (6-18 months), improved use of capital funding over as a result of:
 - a more efficient and effective design process
 - the optimization of capital costs, and
 - a more efficient facility construction and delivery.
- Over the long-term (18 months to 10 years), of:
 - higher facility availability
 - more control over facility expansion by virtue of planning at the outset for expansion
 - lower capital costs and shorter timeframes for expansion of cable facilities to meet demand (planned and un-planned)
 - improved energy efficiency, and
 - lower operating and maintenance costs.

1.4. Intended Audience

The primary intended audience for the OP is cable operator personnel having responsibility for inside plant network engineering and implementation, as well as cable operator personnel having responsibility for the construction and operation of cable facilities.

Secondarily, the intended audience includes any cable operator personnel having an interest in the design, construction, operation, and use of a cable facility. Such would include personnel in corporate and regional finance groups, technical operations groups, and groups responsible for products and services.

Finally, the intended audience also includes professionals outside of the cable operator who provide design, engineering, project management and other professional services to the cable operator with respect to cable facilities. Such professionals include licensed architects, professional engineers (e.g. electrical, mechanical, structural, civil), urban planners, and specialty consultants, all of whom are trained and skilled in the design and implementation of buildings and may, or may not, have immediate experience with the designing and implementing cable facilities for cable operators.

1.5. Areas for Further Investigation or to be Added in Future Versions

None at time of issue of this version of the OP

2. Normative References

The following documents contain provisions, which, through reference in this text, constitute provisions of this document. At the time of Subcommittee approval, the editions indicated were valid. All documents are subject to revision; and while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

2.1. SCTE References

- No normative references are applicable.

2.2. Standards from Other Organizations

- No normative references are applicable.

2.3. Published Materials

- No normative references are applicable.

3. Informative References

The following documents might provide valuable information to the reader but are not required when complying with this document.

3.1. SCTE References

- SCTE 184 2015
- SCTE 226 2015

3.2. Standards from Other Organizations

- No informative references are applicable.

3.3. Published Materials

The American Institute of Architects (AIA), the Royal Architectural Institute of Canada (RAIC), and other such bodies around the world have developed, published and require their professional members to adhere to standards and codes of practice. Such standards and codes of practice are, by implication, part of the OP described in this document, because the OP calls for the engagement of licensed architects in the design process. For cable operator personnel, descriptions of the relevant standards and practices can be found on the websites noted below:

- AIA – www.aia.org, where Form B101–2007 (formerly B151–1997), Standard Form of Agreement Between Owner and Architect, can be found. This form can serve as the Agreement between the cable operation and the architect and, as such, provides an excellent description of the services provided by the architect, and the responsibilities of both the cable operator and the architect in the design process
- RAIC- www.raic.org, where Canadian Standard Form of Contract for Architectural Services – DOCUMENT SIX, 2006 Edition provides a similar resource.

4. Compliance Notation

<i>shall</i>	This word or the adjective “ <i>required</i> ” means that the item is an absolute requirement of this document.
<i>shall not</i>	This phrase means that the item is an absolute prohibition of this document.
<i>forbidden</i>	This word means the value specified shall never be used.
<i>should</i>	This word or the adjective “ <i>recommended</i> ” means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighted before choosing a different course.
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<i>deprecated</i>	Use is permissible for legacy purposes only. Deprecated features may be removed from future versions of this document. Implementations should avoid use of deprecated features.

5. Abbreviations and Definitions

5.1. Abbreviations

AHJ	authority having jurisdiction
AIA	American Institute of Architects
BOM	bill of materials
CFO	chief financial officer
EAS	emergency alert system(s)
FCC	U.S. Federal Communication Commission
e.g.	for example (<i>exempli gratia</i>)
FAA	U.S. Federal Aviation Administration
GIS	geographic information system
i.e.	that is (<i>id est</i>)
ISP	inside plant
ISED	Innovation, Science and Economic Development Canada
MSO	multiple system operator
OEM	original equipment manufacturer(s)
OSP	outside plant
PEG	public, educational, and government services
RAIC	Royal Architectural Institute of Canada
SCTE	Society of Cable Telecommunications Engineers
SEC	U.S. Securities Exchange Commission
SLA	service level agreement
Tech Ops	technical operations
AIA	American Institute of Architects

6. Overview of Cable Facility Design Process

This OP is not a technical document, but a procedural publication. It describes a process that involves a number of parties, inside and outside the MSO, all of which have something to say about what any given cable facility *should* be as building, and how it *should* perform its role as a critical element of the service delivery network.

The process described herein applies to the design of a:

- New facility in a greenfield environment, and
- Modification to an existing facility.

The process is based on a number of fundamental factors that must be considered in the design of a cable facility. Some of these factors are almost completely within the control of the MSO while others are almost completely outside the MSO's control.

At the time of this writing, an increasingly important factor is the requirement to use energy as efficiently as possible in cable facilities in order to minimize energy costs. The cable industry is addressing this requirement under the SCTE Energy2020 Program, which comprises a number of initiatives that collectively span the whole of the cable industry. While not specifically part of the Energy2020 Program, The Cable Facility Design Process, when properly applied, will naturally lead to optimal energy efficiency of the finished cable facility.

Collectively, the fundamental factors make for a complex environment in which to accomplish the design effort, which, by definition, is:

- A constant negotiation amongst the parties and involved, and;
- A balancing of the demands (e.g. very high reliability) and constraints (e.g. limited capital budget) related to the facility design effort.

For every participant in the process, it is critical to know who the parties are, and what each is professionally qualified to speak about. Further, it is critical to have a solid basis of fact describing how the facility supports the business (i.e. the making of money) in order to negotiate successfully with all the parties.

The process is presented at very high level in order to afford the reader an understanding of broader context in which any facility design effort must exist. Naturally, the process will tend to be somewhat simplified with respect to smaller, less complex facilities, and will tend to be a more significant undertaking with respect to major facilities, such as Classes A and B.

With increased complexity comes a longer time frame for completing the design process. The time frame, just for design, not construction, can be as short as several months to as long as a few years. It is reasonable to expect that larger, more expensive facilities will be more complex and take longer to design. However, it is quite often the case that smaller, seemingly simpler facilities can be affected by conditions (e.g. zoning by-laws) that make the design process far more complex than would otherwise be expected, thus much more time consuming.

Regardless of anticipated overall complexity, each element of the design process can be a very complex effort. For any facility project, the design process can be successful only with the appropriate degree of participation of the necessary parties inside the cable operator and with the engagement of professional architects, engineers and planners.