DEVELOPMENT OF A CATV TECHNICAL PRACTICES MANUAL

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ABSTRACT

A Technical Practices Manual as described in this paper can be considered a company operations manual for the technical personnel in a cable television (CATV) system. As a fast growing multiple system operator (MSO) Cox Cable saw a need to document and codify its technical practices to provide new systems with proven operational standards and procedures and help insure that its geographically widely spread existing systems met uniformly high operating standards. Included in this paper are the concepts involved in producing such a document and limited excerpts from the Technical Practices Manual which resulted from this work.

INTRODUCTION

It is the objective of this paper to document the need for a Technical Practices Manual in CATV operation and provide information on how to produce such a manual. This will be done by tracing the steps involved in producing the Cox Cable Communications (CCC) Technical Practices Manual on a "case history" basis. This "case history" will start with an examination of the need for a manual and a subjective cost vs. benefit analysis. The planning, acquisition of input, organization, and mechanical preparation are covered next. Finally, conclusions regarding the work already completed and suggestions for future work and other possible uses of the manual are dealt with.

THE NEED

A Technical Practices Manual is fundamentally an organizational guideline which sets forth broad company policy and prescribed procedures in the technical area of CATV operations. As an administrative guide it can serve to inform all technical personnel of the philosophy and business concepts of top management. For CCC the decision to produce a Technical Practices Manual came because of several anticipated reasons: 1)accelerated growth, 2) an increased number of employees requiring training, 3) new systems being turned on, 4) a desire to provide greater continuity to the company's operation should key technical personnel leave or become unavailable.

A Technical Practices or Operations Manual is probably needed if any of the four areas above apply to an organization.

A successful Technical Practices Manual can help a cable operator:

* ensure continuity despite changes in personnel or management
* create more efficient operation procedures
* create a valuable technical training tool
* define goals and ways to achieve them
* relieve technical management from the constant press and involvement in details
* improve intercompany communications
* provide better employee relations

As a training tool the manual is invaluable to introduce new employees to the companies' policies and practices. A more efficient organizational structure can result from the creation and use of a Technical Practices Manual since people who better understand what they are to do and how to do it tend to do it better. How often have we heard the lament of the employee who says, "I did not know what you wanted me to do." Further, it can help people view their position in terms of long-range rather than short-range goals.

Expansion is simplified when existing procedures are documented in an operations manual and new policy and practices can be more easily incorporated in a set of guidelines already established and well known in the organization.

PLANNING

Once the decision is made to produce a manual an individual or department

must be charged with the task. Before beginning, careful planning and scheduling of the project should take place. The best choice of a person to handle the job is a technically competent individual with a broad perspective of the technical operation and the ability to express himself well in writing. Lacking that combination of talents in one person, it is best to team a good writer with an engineer. As a first step in planning, objectives must be set. The reasons for having a manual, previously discussed, can become a foundation for the objectives of a Technical Practices Manual. At this point it is useful to jump ahead a bit and use an excerpt from the INTRODUCTION section of the Technical Practices Manual.

SECTION 1
January, 1979

TECHNICAL PRACTICES

INTRODUCTION

The construction and operation of a cable television (CATV) system requires the coordinated contributions of many talented people. A typical CATV system has a system manager managing and developing people involved in office, sales, engineering, installation, and construction activities. Their mission or continuing purpose in operating the system is:

To provide cable television service to an ever-increasing number of satisfied customers at a profit sufficient to assure the growth, improvement, and continuity of the company and the people in it, and to contribute to the community in which they operate.

The purpose of this Cox Cable Communications (CCC) Technical Practices Manual is to aid engineering, installation and construction personnel in accomplishing the mission stated above. The key areas in which technical personnel can produce results which help accomplish the mission are:

1. Improved customer service by improving the reliability and quality of the service.
2. Increased professionalism of technical personnel.
3. Lowered operating expenses.
4. Increased useful life of company property.

The technical practices contained in this manual serve as a basic reference text in the technical operations of a CATV system. Cox Cable systems range in size from under 1,000 to over 165,000 subscribers. Since each system and the community it serves is unique no written document could hope to cover every situation. This manual was conceptualized as a set of guidelines and a training reference rather than a hard and fast set of rules. It is not intended to be a substitute for common sense and individual initiative and judgment.

This manual contains no secrets and while its distribution has been limited to Cox Cable technical management personnel, its use and readership can and should include all CCC technical personnel. When wider distribution is required it is suggested that the relevant section or sections be duplicated and posted or given to each individual. No part of this manual should be "borrowed" or permanently removed.

Your suggestions regarding errors or suggestions for improvements are welcome and encouraged. Refer to Practice 4 "Suggestion/Complaint Report Form" and address your comments to the Vice President-Engineering, Cox Cable Communications, Atlanta, and your Division Engineer.

(END OF SECTION 1 EXCERPT)

With the objectives clearly set it is useful to prepare an outline of the general topic areas to be covered. This organization step is important since it is the skeleton of the manual to which the "meat" will be added later to make it complete. It will also greatly affect the ease with which the finished product can be used. Initially the general topic areas included DESIGN/STANDARDS, EQUIPMENT REPAIR, PREVENTIVE MAINTENANCE, and others with individual sections of technical practices such as Earth Station, Microwave, Headend, Studio and Distribution System in each general topic area. This approach was later abandoned for one where general topic areas included EARTH STATION, MICROWAVE, HEADEND and DISTRIBUTION SYSTEM with individual sections in each covering subjects like Design Standards, Corrective Maintenance, and Preventive Maintenance. It was felt that this makes the use of the manual easier and more closely parallels the job functions in a medium or large cable system where one person is more likely to be involved in many aspects of the distribution system than he is working on preventive maintenance for earth station, microwave, headend and distribution equipment. In a smaller system where one individual may, indeed, perform preventive maintenance on all parts of the system the final structure of the manual still proves useful since he/she can find all material dealing with a particular location, i.e., earth station or studio under one general topic area of the manual.

The general topic areas are:

FORWARD
CONSTRUCTION
CUSTOMER SERVICE
DISASTER PLAN
DISTRIBUTION SYSTEM
EARTH STATION
HEADEND
INSTALLATION
MICROWAVE
REGULATORY
SAFETY
STUDIO
SUBSCRIBER TERMINALS
TEST EQUIPMENT
TRAINING
TWO-WAY RADIO
VEHICLES
WAREHOUSE

A more detailed explanation of the "organization and use of the Manual" can be found in Section 3 which is reprinted, in part, below:

SECTION 3
January, 1979

TECHNICAL PRACTICES

ORGANIZATION AND USE OF THE MANUAL

ORGANIZATION

The CCC Technical Practices Manual contains an INDEX followed by numbered sections. The INDEX contains a Table of Contents grouped in general topic areas such as CONSTRUCTION, CUSTOMER SERVICE, HEADEND and EARTH STATION. Each general topic area is broken down into more specific numbered sections which can be located using the numbered tabs in the binder. In the INDEX each section title and number is followed by an issue number if other than the original issue. The Table of Contents itself has an issue date and an issue number (if other than the first, original issue) in the upper right hand corner of each page.

Note that each general topic area such as CUSTOMER SERVICE or STUDIO begins with a General Section and ends with a Forms, Systems, Files section followed by a System Information section. The General section of each topic area serves as an index to the individual practices in that topic area and an introduction to the material to be covered. It may also contain, by default, any material which did not fit into the other practices. The Forms, Systems, Files Section contains copies of all applicable forms, flow chart diagrams showing their distribution and use, and information regarding record retention and how they are to be filed. The System Information Section provides each individual system a place to document information pertaining to the general topic area which is unique to their system.

SECTION FORMAT

Each section covers a specific subject under a general topic area. For instance, the topic of SAFETY consists of the following SECTIONS: General, Safety Manual, and System Information. Each section is an individual Technical Practice. These are identified by a SECTION number, an issue date, and an issue number if it is not the original issue. This information can be found in the upper right hand corner of each page.

Each individual page of a Technical Practice will be numbered in the lower right hand corner of the page practice starting with one (1) for each Technical Practice. The last page of each Technical Practice will include a page number and below that the total number of pages in the practice. See the last page of this practice for an example of this. This procedure should help manual users make sure they have a complete copy of the particular Technical Practice.

The next page of this practice, Technical Practice 3, is an example of the page format used throughout this manual and contains information on the format and content of the Technical Practices.

FORMAT

The format of each Technical Practice will generally follow the structure outlined below.

* Heading (title, number, issue, subject, date, effective date)
* Purpose
* General (background)
* References
* Policy
* Procedures
* Attachments/exhibits (forms)
* Endorsements/approvals

Not all of these items are contained in every CCC Technical Practice. What must be included in every Technical Practice is a "purpose." In defining a purpose the following items should be considered:

* Why is this policy necessary?
* What does it attempt to accomplish?
* Who will read it and why?
* Whom does it affect?
* What action, if any, will/should those who read it take as a result of reading it?
* Is there any reason this policy cannot be written in imperative or narrative style rather than a legalistic-definitional style?
* If it must be written in legalistic style, is there any reason it cannot be humanized, by direct reference to the (classes of) people involved and what actions they should take?

(END OF SECTION 3 EXCERPT)

SCHEDULING

While still in the planning stages of a manual for your organization, a schedule from start to the finish, when the manual is actually issued, should be worked out. Management planning techniques such as PERT, an acronym, for "Program Evaluation and Review Technique", can prove very useful. It should be apparent now that the scope of this project is quite large, if not enormous, and it is not likely that one person has the expertise, or the time, at least in this lifetime, to write a complete manual covering every detail. For this reason the decision was made at CCC to issue a preliminary edition of the manual "as is" to selected personnel. This allowed an early introduction to field personnel, additional input on rough draft or incomplete sections, and a structure in which others within the company could organize their inputs. In addition to being issued in an incomplete state, a manual such as this is always subject to constant change, and the structure must provide for revisions. A portion of SECTION 3 dealing with manual revisions is produced below.

SECTION 3
January, 1979

TECHNICAL PRACTICES

DISTRIBUTION AND REVISIONS

DISTRIBUTION

This manual has been issued to the CCC employee listed on the front page and is for his/her use. It is not to be copied or distributed outside the CCC organization without the express consent of the Vice President-Engineering, Atlanta. The person this manual has been issued to is responsible for its safekeeping, updating with revisions issued by CCC, and its return to the Company at the end of his/her employment with CCC. The postcard form contained in the front of the manual should be returned to Atlanta when the manual is turned over to another person to ensure that future revisions or editions are directed to the proper person.

MANUAL REVISIONS

Revisions to this manual will be issued from time to time as a result of the need to cover new areas of technical operations or update old practices. These will usually come as the result of suggestions received from system personnel using the manual. Each revision will contain:

* Transmittal letter with instructions on including the new or revised practice in your manual.
* Revised "Table of Contents" (if necessary).
* New or revised Technical Practice.

After inserting the revised "Table of Contents" and new or revised Technical Practices in your manual, place the Transmittal Memo, old "Table of Contents" and any pages removed in the rear of the binder. It is suggested that the Transmittal Memo and old "Table of Contents" and any pages removed be placed in the rear of the binder. It is suggested that the Transmittal Memo and old "Table of Contents" be retained permanently and any other removed pages discarded after twelve (12) months. This will help you ensure that your manual contains all current revisions and the history of any revisions can be quickly reviewed. A sample Transmittal Memo is included as a part of this practice.

SAMPLE TRANSMITTAL LETTER

Date _____

NOTICE OF MANUAL REVISIONS

The accompanying new and revised pages, comprising of 5 sheets, (10 pages) are to be incorporated into your CCC Technical Practices Manual by making the following page removals and insertions:

REMOVE		INSERT	
Section	Issue	Section	Issue
INDEX	2	INDEX	3
7	2	7	3
25	1	25	2

It is suggested that you do not discard any pages. The pages you have removed

should be filed in the rear of the binder along with this Notice of Manual Revisions. Retain this Notice and any old Index section "Table of Contents" permanently. Retain for reference purposes the other sections replaced for twelve (12) months from the date above.

(END OF SECTION 3 EXCERPT)

OBTAINING INPUT

Perhaps the best starting point in gathering information or input for the project is to conduct personal interviews with key individuals. For an MSO This would mean the Director of Engineering, Staff Engineers, Purchasing Agents, Division and Regional Engineers. At the system level this involves the System Engineer, Chief Technician, Construction Supervisor, Install Foreman and Warehouseman. They can provide valuable input regarding existing company policies, some of which may already be documented by internal company policy memorandums. This is a good time to look and listen. Do not try to rewrite the book on company operations. A Technical Practices Manual will only be successful if it is used and initially it will only be used if it reflects the present way of doing things and makes use of the valuable input received from key individuals. The manual is a bit of a public relations project and must be "sold" to its future users.

Standard industry practices such as the use of .412" and .500" aluminum cable may not require documentation in a company Technical Practices Manual, but each should be reviewed for inclusion since what is obvious to the experienced engineer may not be to the CATV newcomer. Several organizations issue standards in the United States, including the NCTA, IEEE, FCC and the ANSI (American National Standards Institute). Those standards which affect CATV should be included at least by reference. CATV manufacturers also have a wealth of information which they have made available to the industry.

Correspondence and person-to-person interaction with other cable operators can provide invaluable input and help prevent you from "reinventing the wheel." Much of the background material for the Technical Practices Manual came as a result of participation by Cox Cable engineers on the NCTA Engineering Advisory Committee (EAC) and Operating Procedures Subcommittee.

ORGANIZING THE INPUT

Once the input reference material had been gathered and separated into the general topic areas previously discussed, it became necessary to expand on these general areas. Subdividing the manual into many sections allows the user faster access to the specific information he needs. An additional benefit for the writer is that it breaks up the project into manageable "bites" which can be handled one at a time. It also facilitates issuing a partially completed manual since missing sections can be added to the framework at any time.

Appendix A is a complete listing of the Table of Contents for the Technical Practices Manual. The topic areas are, for the most part, self-explanatory, with the exception, perhaps, of the DISASTER PLAN. The sections contained under this topic area are contingency plans in the event a part of the system was destroyed in whole or part by a manmade or natural disaster. Imagine, if you will, the usefulness of preplanning should your headend be destroyed for any reason.

Because of their bulk and necessary wider distribution the Contruction Manual, Technician's Manual, Installer's Manual, and Safety Manual are not included in the Technical Practices Manual but only referenced.

MECHANICAL PREPARATION

How to package the finished product is the next step. Remember that this involves some public relations aspects in addition to the more mechanical considerations such as number of pages. You must "sell" the manual to its future readers. A professional looking binder and approach to page layout will increase the useage of the manual. Since frequent revisions are expected a standard three-ring binder for an 8½" x 11" page was chosen. A 2" wide binder is a good choice since bigger binders are harder to use and their bulk usually means wrinkled or torn pages. Plastic "sheet protectors" should be used at the front and rear of the binder. Pockets on the inside covers can provide a handy place to store other written material. A second 2" wide volume is anticipated, in the near future, to handle the large amount of material. A distinctive printed cover sheet was produced which was cut into three sections corresponding to the front and rear covers and spine of the binder. These were then "heat sealed" to the binder using a clear plastic. This produces an attractive and durable binder. This type of binder is expensive, five to seven dollars each, even in quantities of fifty. If only a few copies are required a standard binder is recommended. It can be customized, inexpensively, by printing directly on the vinyl cover.

The tabs are custom printed with a complete set containing 109 tabs titled INDEX and 1, 2, 3....107, and 108. Each tab is plastic coated and ring binder

holes are plastic reinforced. The tab sheets themselves are of paper stock considerably heavier than that used to print the pages. All of this should help to extend their life under heavy useage. These customized tabs are very expensive (approximately $55 per set) in small quantities, and a printer considers 50 sets a very small quantity! If you are producing only a few volumes, use clear plastic tabs which can handle insertable titles.

The number of pages in the initial edition was estimated to be 400. Several methods of reproducing these were considered, including typesetting and printing, photo-offset printing of typed copy and use of the office copying machine. Typesetting produces very professional copy with left and right justified margins. It also allows approximately a 50% reduction in the page total. For comparison purposes typesetting costs approximately $25 per page when printing five hundred (500) pages on two hundred and fifty (250) sheets, i.e., printed front and back. Typesetting was rejected as too expensive and lacking the flexibility to issue small revisions later which matched the original printing style without going back to the printer. The office copying machine is the least expensive alternative for small quantities but copies lack the professional "look" that was being strived for. An IBM Selectric typewriter with a carbon ribbon was used to prepare copy which was reproduced using a photo offset technique. Photo offset printing costs about $8 per page in 250-page quantities. The heatsealed binder, printed and plastic reinforced tabs and the photo offset pages produced a finished and professional appearance.

CONCLUSIONS

A continuing effort is underway to complete sections of the manual and add substance to the skeletal framework described in this paper. Farming out of certain sections to inhouse experts in a particular field is being pursued in order to reduce the enormity of the task. Even if you have little desire to produce a formal Technical Practices Manual, it is suggested that, perhaps, the Table of Contents could serve as guide in filing and retaining the memorandums issued in your organization. After a period of time an accumulation of information should occur which will provide you with a fairly concise and complete technical operations guide.

A possibility for future work in this area might involve the National Cable Television Association (NCTA) or Society of Cable Television Engineers (SCTE) providing binders, tabs and a partial set of technical practices as a sort of "seed" kit to interested cable operators. NCTA or SCTE members could provide information leading to the issue of suggested technical practices on a regular basis. This might help produce a reference handbook in the cable industry akin to the National Association of Broadcasters (NAB) Engineering Handbook which, in its several revisions, has served the broadcast industry so well.

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APPENDIX A

TECHNICAL PRACTICES

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