

# VIDEO TAPE



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Research and Development Division  
Oklahoma Department of Transportation

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Video Tape, A Research Implementation and Training Tool

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Conducted  
By

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of the  
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## EXECUTIVE SUMMARY

The scope of this research effort was to develop the use of Video Tapes for research documentation and implementation and training within the Oklahoma Department of Transportation.

Equipment that was acquired in this project consists of a distribution system, a dubbing system, a field production system, and an editing system. The dubbing system allows making copies from one tape to another as well as copying from 3/4" tape to 1/2" tape. The distribution system consists of 10 player/receivers. Each Field Division has a player/receiver and the Central Office has 2 player/receiver.

The Education Television Service at Oklahoma State University was instrumental in the development of the ODOT's use of the video medium. Their services and facilities, from script writing to finished production, continue to be utilized to make professional quality video programs.

A video unit has been established in the Training Office of the ODOT to carry on the effort as a routine function. A studio has been constructed and equipped to make productions. A staff of four has been hired. The Research Division continues to be a heavy user of these services.

As a supplement to the final report a video tape has been produced to depict the activities of the project. A copy is available by contacting C. Dwight Hixon, Research Engineer, 200 N. E. 21st, Oklahoma City, Oklahoma 73105 (405) 521-2671.

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## The Problema

Research, oriented toward problem solving, is an important part of modern highway and transportation departments. But research engineers have a long standing problem of their own; communicating research results to the users.

If research is to have any meaning, other departmental engineers, as well as construction and maintenance personnel in the field, need to receive and implement new knowledge gained through scientific research.

As early as 1974, the Oklahoma Department of Transportation (ODOT) Research and Development Division began experimenting with video tape as a means of presenting research findings.

## Background

In 1975, a two year research project was initiated to evaluate various uses of color video tape within the Department of Transportation. Research Division personnel wanted to explore the full potential of the medium, and to determine what, if any, purposes it could fulfill. The following areas were explored.

### Documenting Research

2. Presenting Findings
3. Training
4. Orientation
5. Other Uses

The project required new equipment and outside expertise in the field of video production. After consulting with several vendors and television professionals, the Department decided on the 3/4" video cassette format.

In 1975, this format was more highly developed than any other, except the 2" reel-to-reel format used in commercial broadcast facilities, which was considered too expensive for industrial purposes.

A mobile production van was purchased and equipped with a 3/4" video cassette player/recorder, a television monitor, a portable color video camera, a sixteen millimeter film camera, and a shooting platform on the roof.

In addition, a contractual agreement was made with Educational Television Services at Oklahoma State University to assist in production of programs during the project.

Video tape production is an involved process which includes writing a shooting script, shooting visuals on location, preparing art work as necessary, recording the narrative, selecting the background music, and finally, editing all the components into a finished program. Educational Television Services had the experience, personnel and equipment necessary to accomplish this process.

During the initial video evaluation project, several programs were produced. On some projects, such as "Two Course Concrete for Bridge Decks", the Department's Training Office was involved during production of the video tape. Thus, the resulting program could document placement procedures, and later, serve as a training tool.

During December of 1975, Oklahoma placed a concrete bridge deck that incorporated wax beads in the concrete. In March of 1976, the deck was heat treated, causing the wax beads to melt and flow into the capillaries and pores, thus sealing the deck against moisture and chlorides.

The entire procedure was filmed and produced into a video tape program. This tape was made available for national distribution through the Federal Highway Administration.

Occasionally, video and motion picture films were used to document unusual events. In May of 1976, a bridge on the State highway system collapsed. Engineers studying the cause of the failure, requested that the damaged bridge be video taped prior to, and during the removal process.

During the time of the initial video evaluation project, the Research and Development Division was in the process of implementing a program of land management and roadside erosion control. Based on several years of prior investigation, research engineers recommended that a program of chemical weed control be incorporated into the overall land management system.

Demonstration projects were implemented in each of the eight ODOT field divisions. As work proceeded on the weed control projects, video tapes were produced which documented the methods, and could later be used for training new personnel. Additionally, tapes of the different projects could be exchanged between divisions.

Within the scope of the original video evaluation project, eleven video tape productions were completed. Overall, response to these programs was positive, with added enthusiasm generated because people in the field divisions were involved from the beginning, and had input into the preparation of the tapes.

At the conclusion of the evaluation period, Research Division personnel recommended continued use of video tape for documentation, implementation of research findings, and training

purposes. The June 1977 report on "Video Tape Used in Research Documentation" was published by the Research Division. It was also recommended that the Department establish a more sophisticated in-house production system, and a distribution system to facilitate use of the programs by the field divisions.

RECOMMENDATIONS:

1. Continue Video Use For:
  - \*Documentation
  - \*Implementation
  - \*Training
2. Establish in-house production system
3. Establish in-house distribution system

## Discussion

Budget limitations prevented full adoption of the in-house production system. However, the production contract with Educational Television Services was renewed, and the Research Division began evaluation of equipment for a distribution system.

As planning for a departmental distribution system continued in 1979, a new video format was perfected; the 1/2" video cassette. Half inch cassettes offered good picture quality at considerably less cost than 3/4" cassettes. This was a contributing factor in the Department's decision to purchase ten, half inch video cassette player/recorders, with television monitors.

The new equipment made playback systems available in each of the state field divisions, and the central office in Oklahoma City. The remaining recorder was interfaced with a 3/4" cassette player, so that 3/4" programs could be dubbed (copied) to the 1/2" format for distribution to field offices.

An established distribution system opened the door to another use of video. Training films (16 mm) could be recorded onto video tape, by means of a device called a film chain, and then distributed to the field divisions on video cassettes.

As the video production project continued, several new training tapes were produced on chemical weed control procedures, with the ultimate objective of building a complete

herbicide training series. Research Division personnel now feel that these programs were a contributing factor toward successful implementation of the chemical control program which is now widely used in Oklahoma.

In addition to the herbicide series, training programs were produced on various road surface maintenance procedures.

New research projects continued to be documented.

Even public relations uses for television were investigated. A series of 30 second public service announcements were aired on most Oklahoma television stations.

During the original video evaluation project, the majority of location shooting was done with 16 millimeter motion picture film cameras. Then, after processing, the film was dubbed to video tape for editing.

During the late 1970's, a new generation of high quality portable video cameras was born, along with portable 3/4" recorders which could operate on batteries in the field. In 1978, Educational Television Services began shooting Department of Transportation programs with video, rather than film. There are several advantages to using video tape as a production tool. Video tape works about the same way audio tape works. Pictures and sound are electronically recorded on magnetic recording tape, which can be played back immediately after the recording process takes place. No film of any kind is involved in the process. Thus, film developing costs are eliminated, and

there is no time lost waiting for film to be processed. Results are immediate, and the tape can be reviewed in the field.

ADVANTAGES OF VIDEO:

1. No Developing Costs
2. No waiting time
3. Immediate results
4. Review on Location

Additionally, unlike film, video tapes can be reused. In the recording process, any old pictures and sound already on the tape, are automatically erased as the new video is recorded. Accidental erasure can be prevented by removing a plug on 3/4" cassettes, or breakout tabs on 1/2" cassettes.

More and more, video tape appeared to be a viable means of distributing all kinds of information, to users both inside and outside the Department of Transportation.

A training series was produced for the Materials Division.

The Planning Division produced a tape about Archeology, which explains the importance of preserving archeological sites discovered during the planning or construction of new roadways.

Various Research Division activities continued to be documented and shared with users and other interested parties.

As new herbicides, equipment, and methods of application were developed, the herbicide training series was expanded and

updated, keeping field personnel current on the latest information.

A one-time expansion bearing lubrication project was documented by the Bridge Division.

In 1980, the Department expanded in-house production capabilities with the acquisition of a new portable video camera, a portable 3/4" recorder, and a 3/4" video cassette editing system. (See Appendix B for photographs of equipment) (See Appendix C for a list of the equipment). A staff of four people, including two producer/directors, an administrator and a technician were hired to produce video tapes internally.

Recent video productions have gained national and international recognition for the Oklahoma Department of Transportation.

The Federal Highway Administration has requested copies of several programs such as "Impact Attenuators: Saving Lives on Oklahoma's Highways." Transportation Departments in several other states have asked for copies of various herbicide training programs. Research documentation productions such as "Chem-trete" have also been highly requested.

In 1980, one of the "Be Aware - Take Care" spot announcements won first place in the annual competition sponsored by the Oklahoma Film and Television Producers Association.

Research in the field of wind generated electrical energy was recently featured in a state-wide television program.

Wide interest in the many video programs, from both within and outside the Department, has led research personnel to recommend full implementation of video tape as a medium for the exchange and presentation of myriad information.

## Conclusions and Recommendations

Effective in October of 1982, the Department transferred video production functions and equipment to the Training Office. Educational Television Services remains under contract to the Department to assist in video production. The average 1982 production cost is approximately \$4,200 for a 20 to 30 minute tape. Twenty minute tapes appear to be the optimum length for keeping the audience's attention. The Research Division will continue to make use of video, and will maintain a liaison relationship with video personnel in the Training Office.

It is recommended that the original goals listed below be carried forward in their entirety.

Because of budget limitations some outlined equipment was not purchased.

1. Research Documentation (use of video)
2. Research Implementation (use of video)
3. Training (use of video)
4. Establish in-house production system

These recommendations would necessitate a working liaison between research and training which already has been established.

We belong to an age in which people have grown accustomed to watching television, an age in which the electronic screen is an important source of new information, in a highly technical and rapidly changing world.

For documenting research, sharing research findings, and for training applications, video tape programs have proven their worth to the Oklahoma Department of Transportation.

APPENDIX "A"

List of Video Tapes Produced During Project

1. "High Noon for Herbicides" (Calibration and Mixing).
2. Effective Land Management thru Vegetative Ground Cover and Chemical Control.
3. Brush Control
4. Johnsongrass
5. Atrazine Application
6. Rope Wick (original demonstration)
7. Rope Wick II (Mounting Documentation and Instruction)
8. Rope Wick Strikes Again (Training - How to Use)
9. Willow Control
10. Herbicide Safety - It's Up To You.
11. Chemical Control - Keep The Right Of Way.
12. Destroying Sandburs.
13. Man The Spray Rig.
14. Shoulder Treatment.
15. Pre-Emergence Herbicides.
16. Save That Road - Asphalt Armorcoat (Chipseal)r
17. Bridge Deck Repair - Deck Form Hanger Technique.
18. Save That Road. Part I -Machine Patching Cutout Failures.
19. Save That Road. Part II - Surface Restoration.
20. Water Emulsified Soil Asphalt

21. Materials Testing School \*\*Series\*\*
22. AASHTO T- 23
23. AASHTO T- 27
24. AASHTO T- 88
25. AASHTO T- 90
26. AASHTO T- 99
27. AASHTO T-119
28. AASHTO T-141
29. AASHTO T-152
30. AASHTO T-164
31. AASHTO T-176
32. AASHTO T-205
33. AASHTO T-238
34. Research and Training Applications for Television.
35. Solar Heated Maintenance Asphalt Storage.
36. Vibrator Systems for Bridge Deck Construction.
37. Wind Energy, an Alternative.
38. Chem-Trete - 10 minute version.
39. Chem-Trete - 16 minute version.
40. Crack Sealing
41. Polymer Concrete
42. Guardrail Installation
43. Challenge at Limestone Creek - The plan.
44. Impact Attenuation Systems.
45. Type A Polymer Concrete Overlay.

46. Video Summary 1981 - The Movie Version.
47. Archeology - A Bridge To Our Past (Planning).
48. Sign Vandalism Kills (Public Service Announcement)
49. Staying Alive (Safety and Hazards).
50. Motivating With an "I Can Do Attitude".
51. Expansion Bearing Lubrication - Kaw Reservoir Bridge

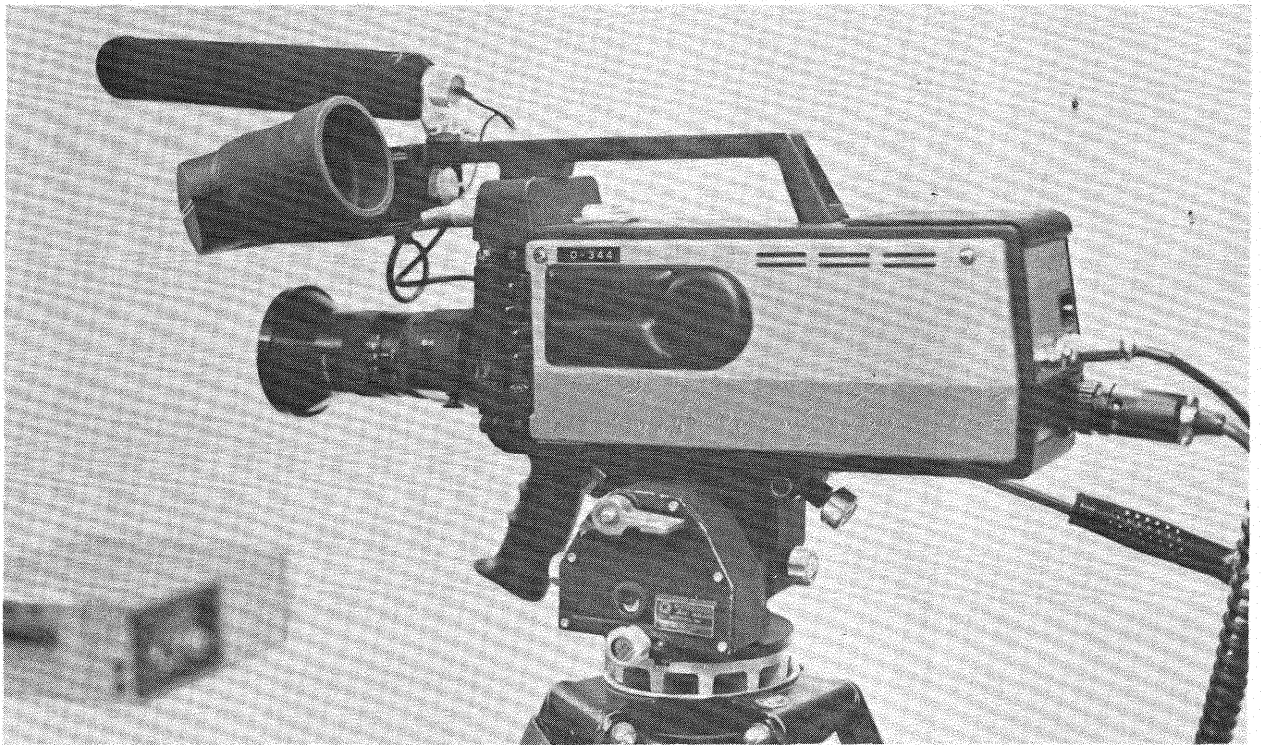


Figure B-1 Video Camera

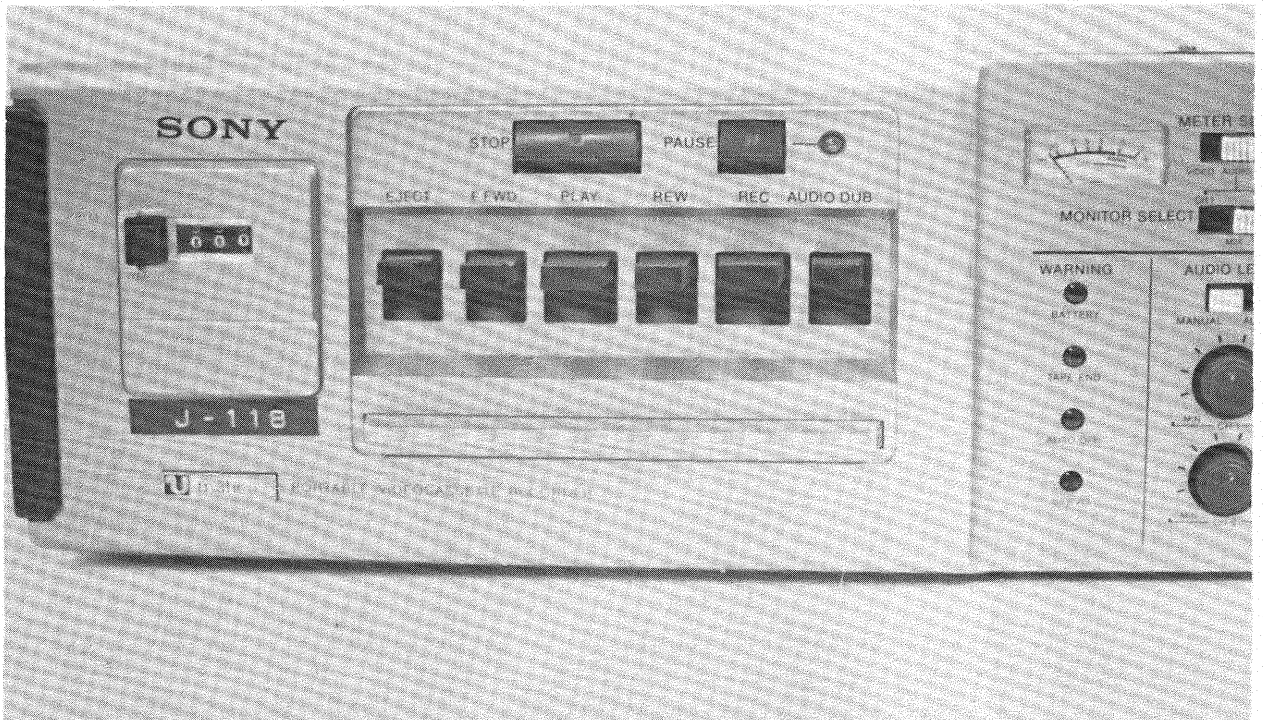


Figure B-2 Video Recorder



Figure B-3 Camera and Recorder in Backpack

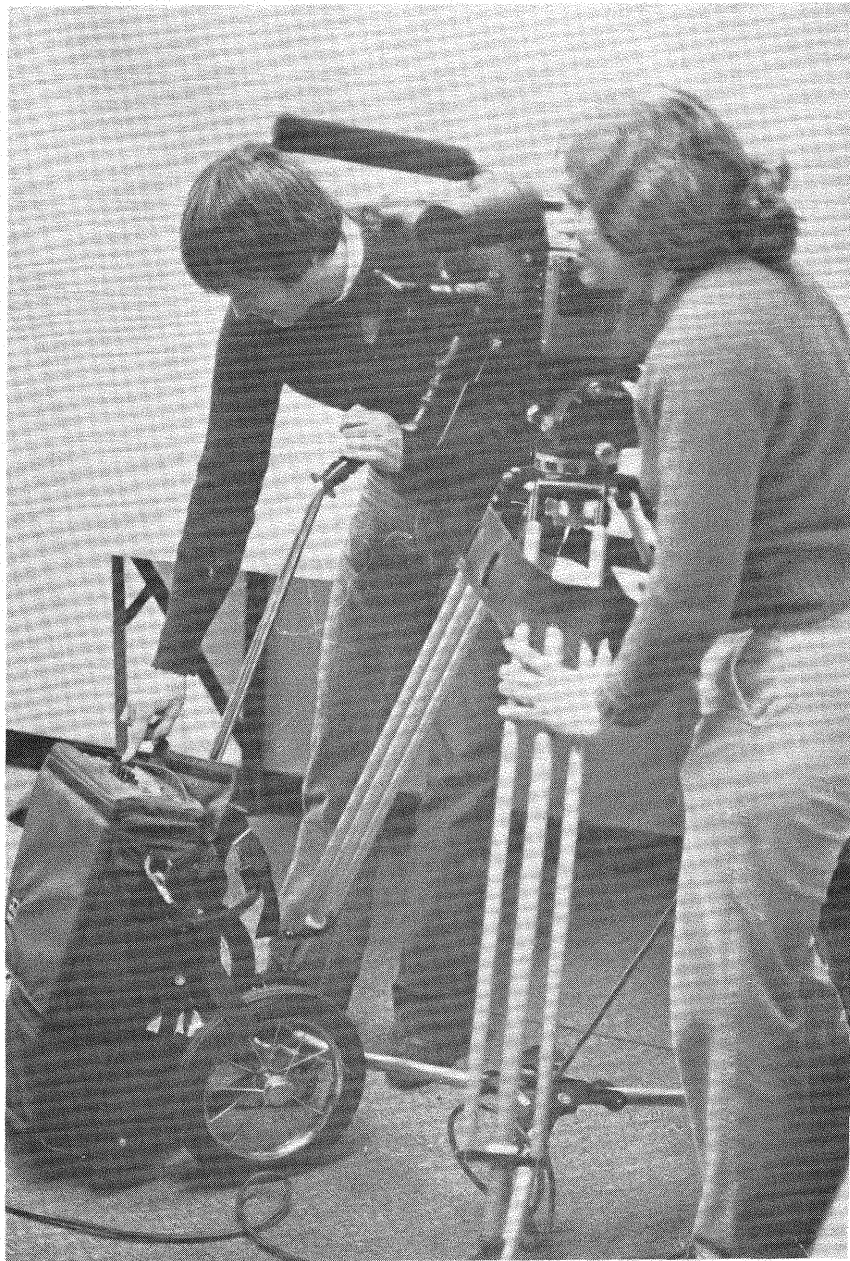


Figure B-4 Camera and Recorder in ENG cart.



Figure B-5 Editing System

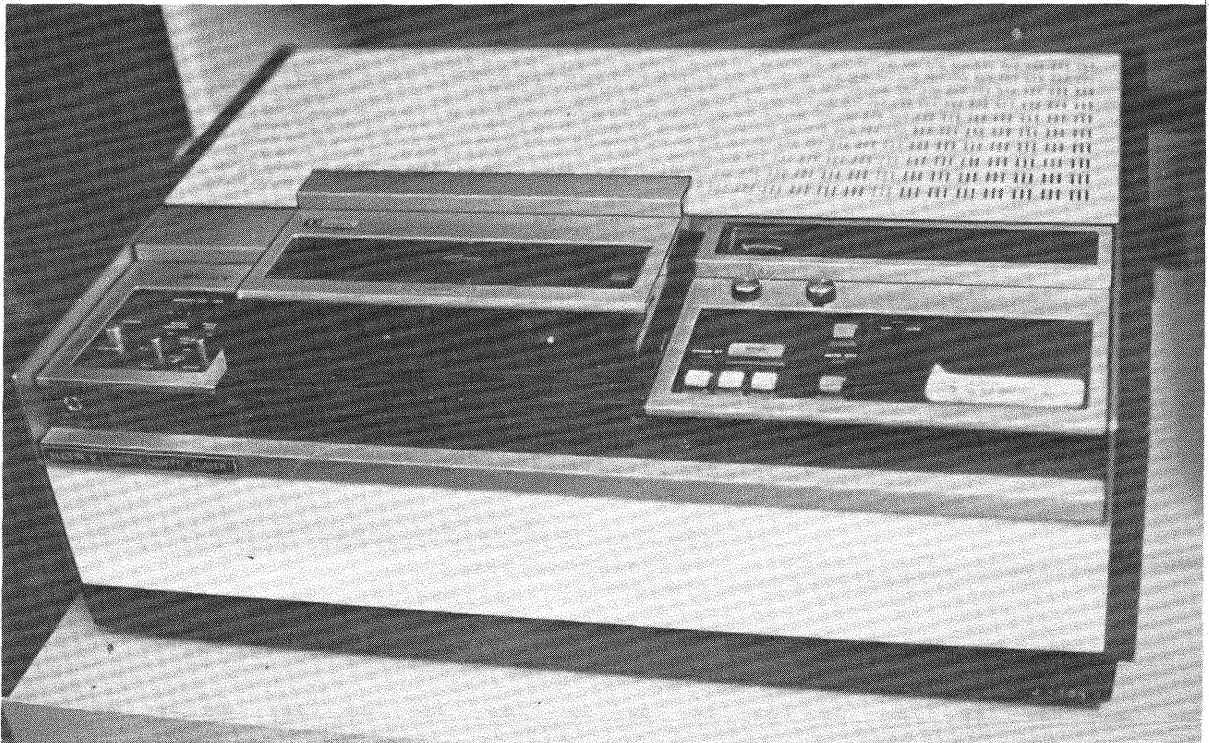


Figure B-6 Editing System Player

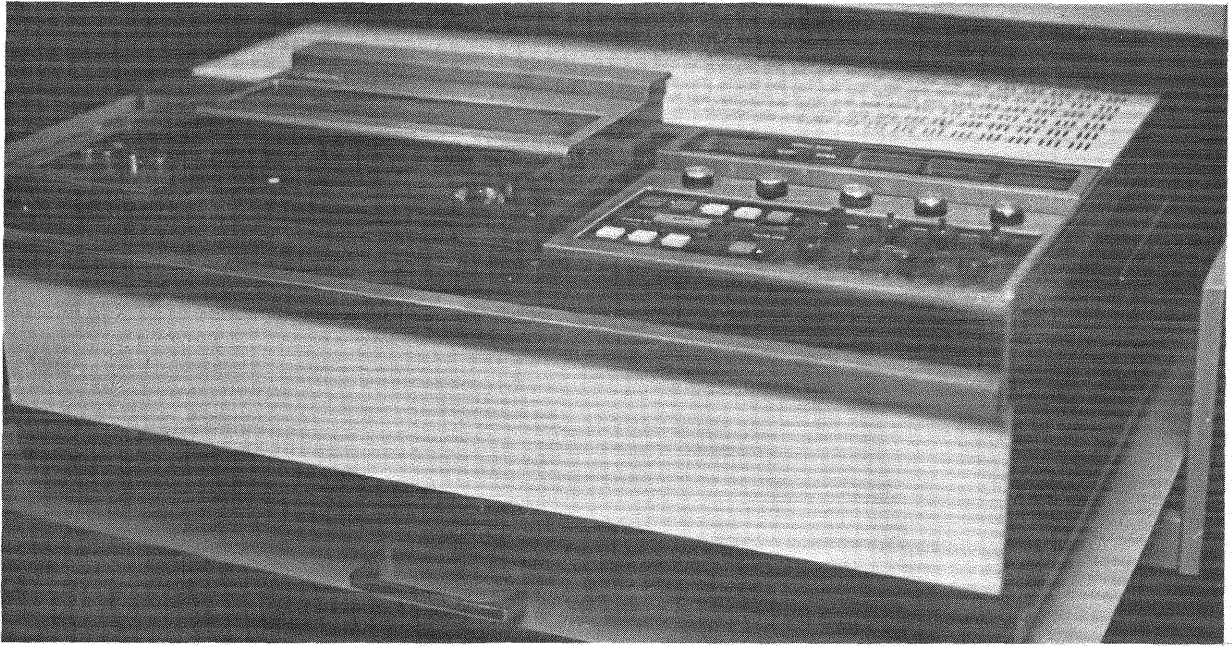


Figure B-7 Editing System Recorder

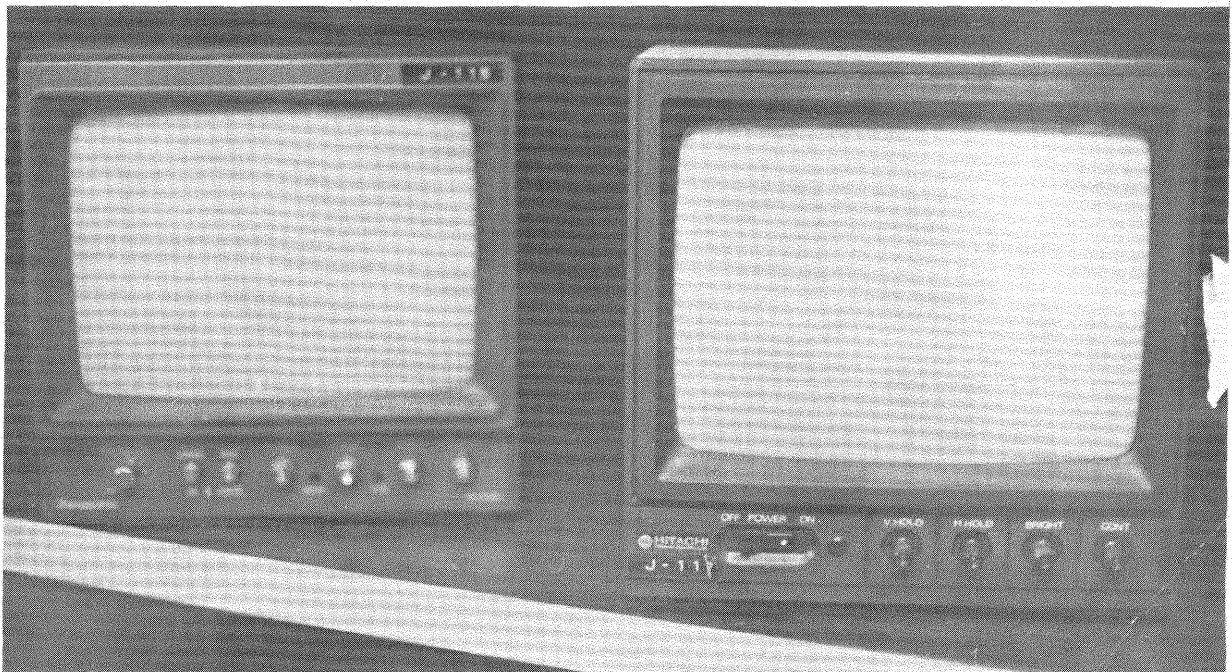


Figure B-8 Editing System: right monitor for player, left monitor for editing information.

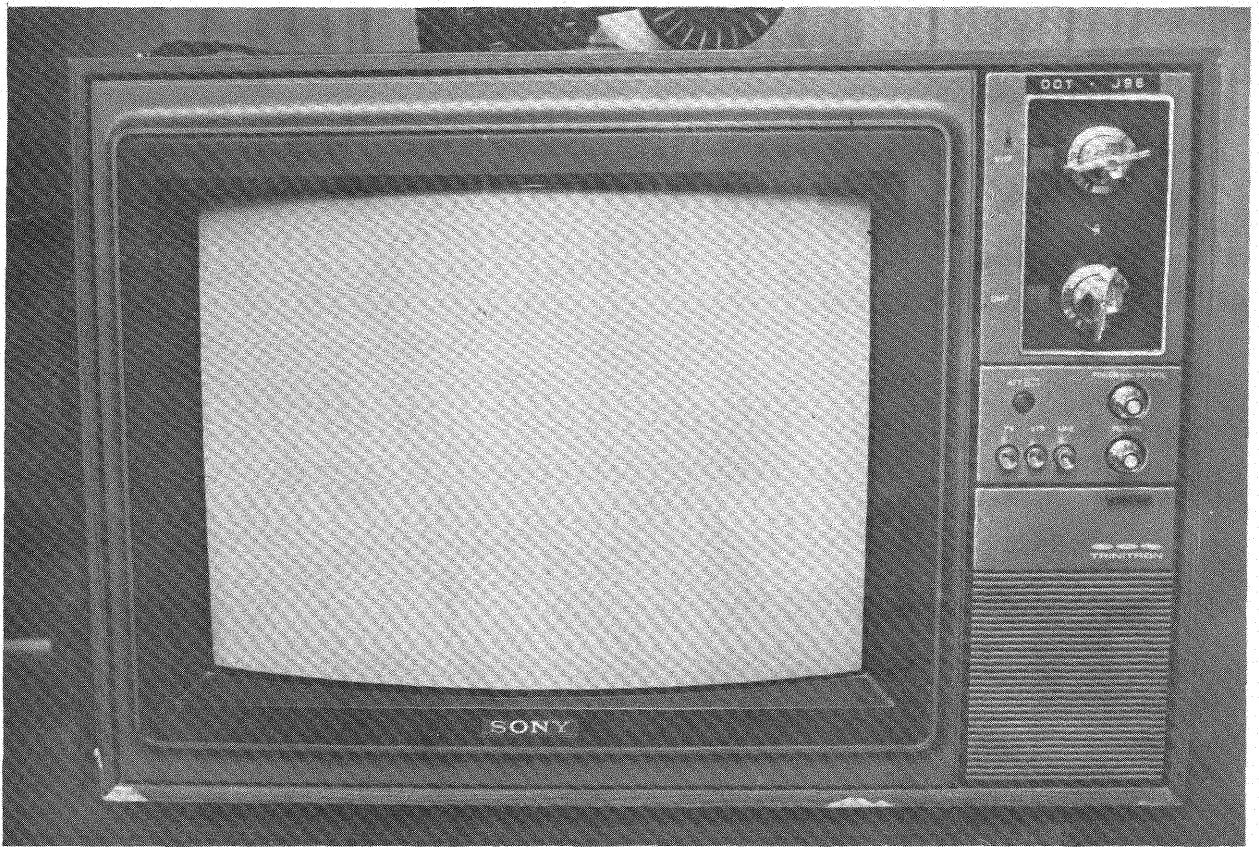


Figure B-9 Program Monitor

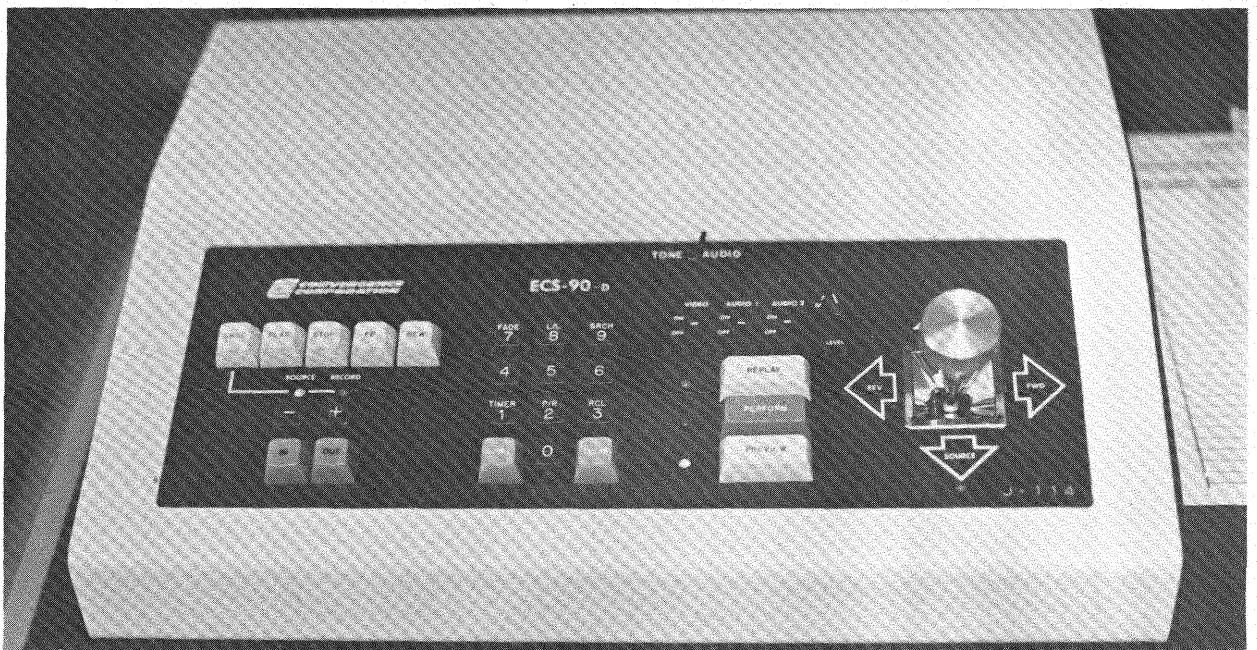


Figure B-10 Editor Console

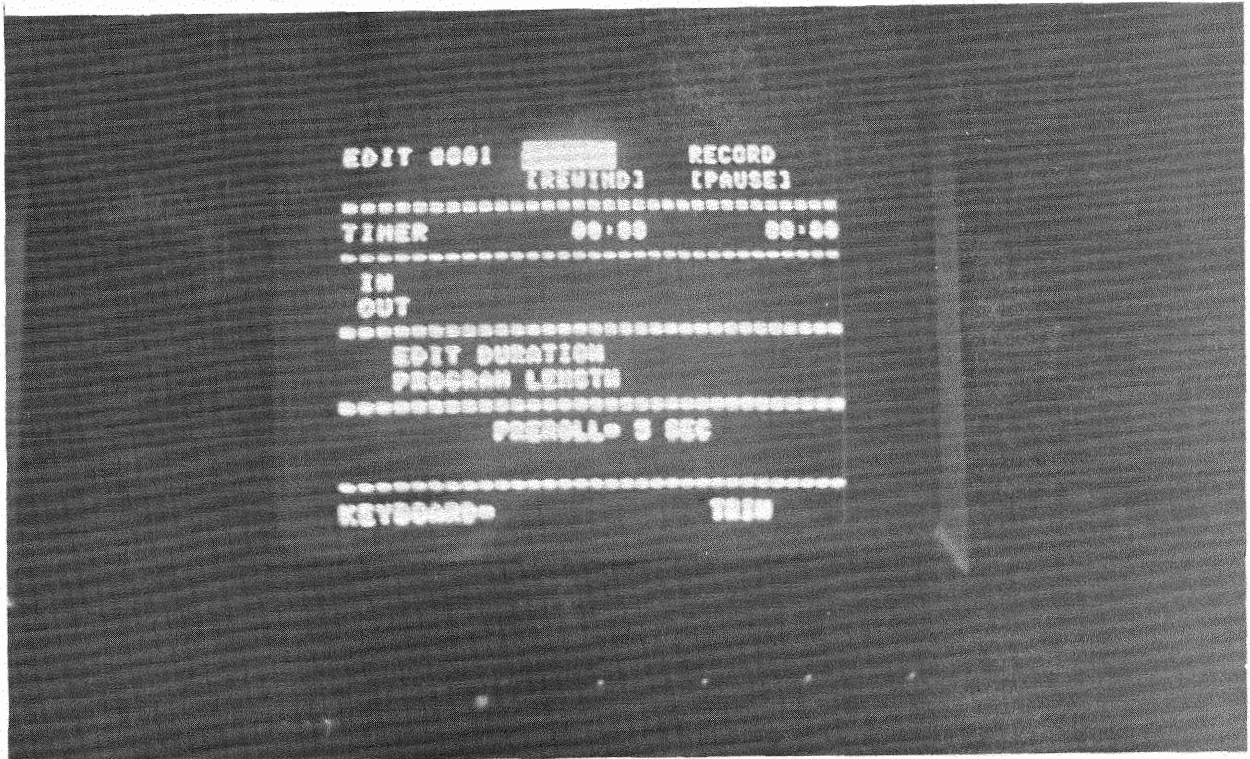


Figure B-11 Information Monitor

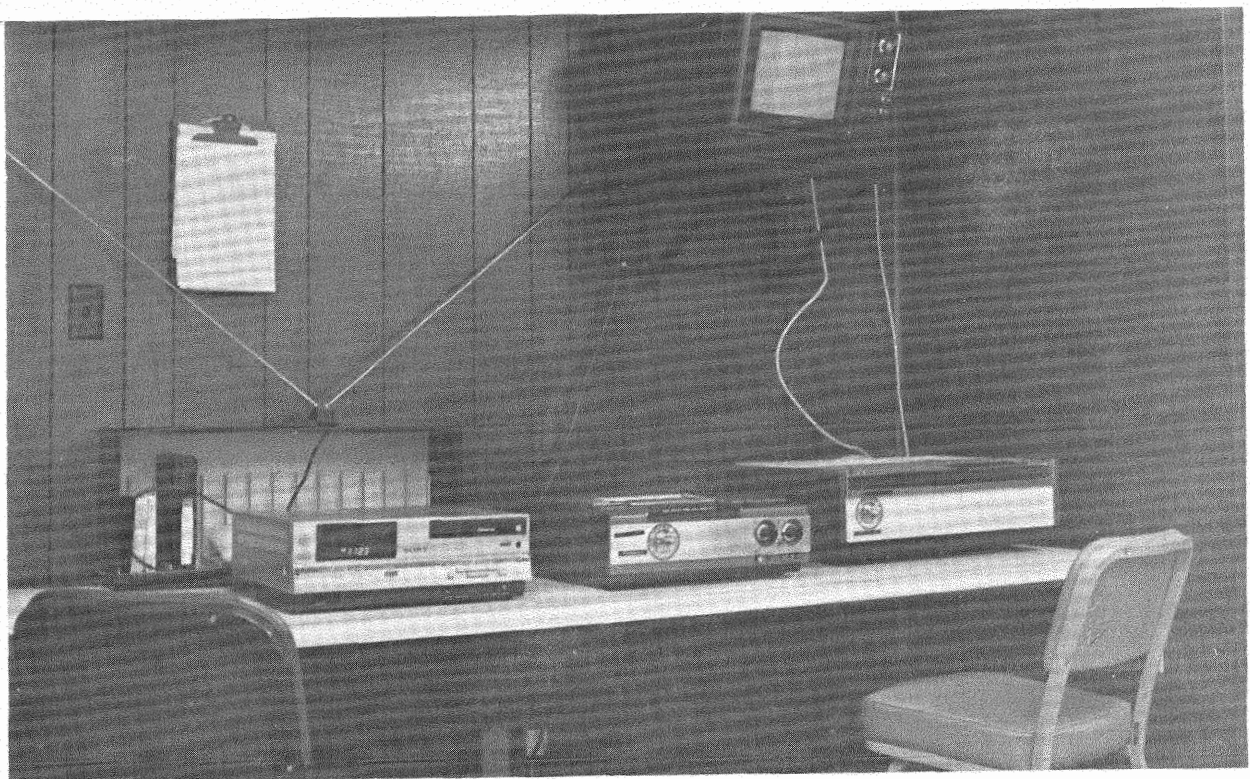


Figure B-12 Dubbing Equipment



Figure B-13 Video Library

APPENDIX "C"  
EQUIPMENT LIST

Distribution System:

- 10 - Panasonic NY8160 Color Video  
Cassette Players
- 10 - Sony KV1911 Color Receivers
- 10 - Bretford VIRC30E Mobile TV and  
VTR Center

\$13,890

Dubbing System:

- 1 - Panasonic NV8310 Editing Color Video  
Cassette Recorder
- 1 - Sony CVM1750 Color Monitor
- 1 - Panasonic NY3160 Reel-to-Reel  
Color Recorder

4,288

Electronic Field Production System:

- 1 - Hitachi FP3030 G Color Video Camera
- 1 - Sony 4000 Video Cassette Recorder
- 1 - KV8000G Color Video Monitor

18,075