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SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

FIRE/LIFE SAFETY PROGRAM PLAN

Continuing Preliminary Engineering Edition

JANUARY 1984

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1.0 INTRODUCTION

1.0 INTRODUCTION

The SCRTD Metro Rail Fire/Life Safety Program identifies a series of required activities which take place during the various phases of the Metro Rail Project, all directed toward meeting the elements of safety established by the Fire/Life Safety Criteria.¹ The program includes the application of a management structure, safety techniques, and a methodology necessary to achieve reasonable levels of fire/life safety commensurate with the phases of the Metro Rail project.

1.1 Authority

California enabling legislation in 1964, under Public Utilities Code Part 3, created the Southern California Rapid Transit District (SCRTD). The law included the mandate to develop a rapid transit system. Chapter 5, Article 5, Section 30646 of the Public Utilities Code empowered the Public Utilities Commission (PUC) to provide oversight and regulate the safety aspects of the transit property. Under this authority, the PUC governs the safety appliances and procedures of SCRTD property, monitors the use of appliances from the aspect of safety, and conducts inspections to monitor adherence to the rules and regulations.

Additionally, the California Occupational Safety and Health Administration (Cal/OSHA) and the city and county fire departments have cognizance over occupational and fire/panic safety.

Within the Metro Rail Project, a Fire/Life Safety Committee has been formed to oversee the design, construction/acquisition, testing and start-up activities which relate to fire/life safety issues. The Fire/Life Safety Committee has established the Metro Rail fire and life safety criteria, which form the basis for fire/life safety requirements throughout the system's design and operations.

Other agencies having cognizance over safety matters are the Urban Mass Transportation Administration (UMTA), the National Transportation Safety Board (NTSB) and the federal OSHA.

¹ SCRTD Metro Rail System Design Criteria, Volume I, Section 2, November 18, 1983.

1.2 Policy

It is an SCRTD policy, established by the Board of Directors, that fire/life safety be given primary consideration throughout the evolution of the Metro Rail system, from preliminary engineering through revenue operations. To fulfill the obligation of this policy, modern fire/life safety engineering technology and industry standards will be used to ensure that the system achieves a level of safety that equals or betters that of other rail transit systems.

Fire/life safety requirements include hazard elimination or control and provisions for emergencies. During the preliminary engineering, continuing preliminary engineering and final design phases, fire/life safety will focus on eliminating, minimizing or controlling hazards through analysis, review and design selection. This will include provisions for emergencies such as an emergency communications network, on-site emergency equipment and access by emergency forces.

1.3 Goals

The goals of the Fire/Life Safety Program are to define design group activities and management controls, plans and monitoring processes to ensure that:

- o Fire/life safety, compatible with the system requirements, is incorporated in the Metro Rail subsystems during the design phase to minimize the potential of accidents in the system operation phase.
- o Hazards associated with each subsystem of the SCRTD Metro Rail are identified; then eliminated or minimized.
- o Proper provisions are made for fire/life safety equipment and facilities to meet potential fire and emergency response needs.
- o A safety philosophy is inculcated within the Metro Rail system that emphasizes preventive measures over corrective measures to eliminate unsafe conditions.
- o Fire/life safety information generated by the newer transit properties (which have characteristics similar to the SCRTD Metro Rail) is analyzed and used to support the SCRTD Metro Rail fire/life safety program.

- o Security, system assurance and system safety considerations are coordinated with fire/life safety efforts.

The objective of these goals is to minimize the hazards to patrons/personnel and to SCRTD property so that an acceptable level of fire/life safety is achieved.

1.4 Purpose

The purpose of this plan is to set forth the fire/life safety requirements for identifying and evaluating fire/life safety risks throughout all phases of the SCRTD Metro Rail Project. It sets the plan for fire/life safety related activities which occur during Preliminary Engineering, Continuing Preliminary Engineering, Final Design, Construction/Acquisition, Pre-Operational Testing and Start-Up Operations. The plan defines formal requirements including the:

- o Structure of the fire/life safety management organization.
- o Implementation of established fire/life safety criteria.
- o Mechanisms for identifying and assessing fire/life safety hazards early in the design phase.
- o Methods to eliminate, minimize or control the identified critical or catastrophic hazards.

1.5 Scope

The scope of the plan encompasses the management and technical fire/life safety activities performed during preliminary engineering, continuing preliminary engineering, final design, construction/acquisition, pre-operational test, and start-up operations phases of the Metro Rail project. The emphasis of this edition of the plan is to identify the fire/life safety tasks associated with preliminary engineering, continuing preliminary engineering and final design.

Tasks associated with subsequent phases (construction/acquisition, pre-operational test and start-up operations) are identified herein on Exhibit 3-1, but are not detailed in this edition of the program plan. These descriptions will be part of a subsequent update.

This edition of the Fire/Life Safety Program Plan, for use during the preliminary engineering, continuing preliminary engineering and final design phases, defines

the fire/life safety-related activities which will be performed to support system designers in the preparation of system and subsystem specifications. It also lays the groundwork for the monitoring of SCRTD Metro Rail contractors and subcontractors during construction and acquisition of Metro Rail facilities and equipment.

A companion document, the System Safety Program Plan, was prepared during preliminary engineering to address specific tasks relating to system safety. At the conclusion of the continuing preliminary engineering phase, this Fire/Life Safety Program Plan will be incorporated as part of the SCRTD's updated System Safety Program Plan.

1.6 Update Procedures

The System Safety Program Plan will be updated prior to the start of each new phase of Metro Rail activity (i.e. final design, construction/acquisition, pre-operational test, start-up operations) to:

- o Review progress in tasks accomplished in the prior phase.
- o Constantly refine and improve the current task descriptions and existing procedures.
- o Identify new tasks which may be required as the system progresses.
- o Explain in detail the safety-related tasks and responsibilities for the next phase of Metro Rail.

The analysis, review and revision process is the responsibility of the Supervisor; Metro Rail Safety, Security and Systems Assurance Office. Inputs for these periodic updates will be solicited from SCRTD Systems Design and Analysis, Fixed Facilities, Construction Management, the General Consultant, the Systems Engineering and Analysis Consultant, the Construction Manager, and the Fire/Life Safety Committee.

1.7 Glossary of Terms

The following presents a glossary of terms used in this Fire/Life Safety Program Plan.

SCRTD - Southern California Rapid Transit District; an agency created by the California legislature - charged with the development of a rapid transit system.

- UMTA - Urban Mass Transportation Administration; an Administration of the U.S. Department of Transportation - the federal agency that assists state and local governments in financing transportation, both in capital equipment procurements and in operating subsidies.
- CPUC - California Public Utilities Commission; the agency empowered to maintain overview and regulation in transit safety for the State of California.
- Cal/OSHA - California Occupational Safety and Health Administration; the agency having regulatory and enforcement powers over construction activities and working conditions once the Metro Rail system is operational.
- NTSB - National Transportation Safety Board; which has the responsibility for, and authority to, conduct accident investigations and make recommendations at the Federal Government level.
- MRTC - Metro Rail Transit Consultants; also known as the General Consultant (G.C.), a joint venture of Daniel, Mann, Johnson, Mendenhall/Parsons, Brinkerhoff, Quade & Douglas/Kaiser Engineers/Harry Weese and Associates (DMJM/PBQD/KE/HWA).
- BAH - Booz, Allen and Hamilton; also known as the Systems Engineering and Analysis (S.E.A.) Consultant.
- Fire/Life Safety² - That portion of safety which deals with fire protection, fire suppression and emergency preparedness.
- System Safety³ - The application of operating, technical and management safety techniques to the system to reduce hazards to the lowest level possible within system resources.

2,3 Milestone 7, Safety, Fire/Life Safety, Security and Systems Assurance, March 1983, Chapter I, Key Terms.

1.8 Applicable Documents

The following list of documents were either used in the preparation of the fire/life safety elements of this program plan, or are references and related information:

Metro Rail Safety Criteria, WBS 13DAD, Booz, Allen & Hamilton and Kaiser Engineers, September 1982.

Metro Rail Fire/Life Safety Criteria, SCRTD Metro Rail System Design Criteria, Volume I, Section 2, Fire/Life Safety Committee, November 1983.

Safety, Security and System Assurance Plans - SCRTD Metro Rail Project Milestone Report 7.

Metro Rail Project Definition and Objectives, WBS 13DAH, Booz, Allen & Hamilton, December 1981.

Review of Codes, Guidelines, Regulations, and Other Information, Subsystems, WBS 12F, Kaiser Engineers, March 1982.

Content Guidelines for the Development of System Safety Program Plans for Fixed Guideway Transit Systems in the Acquisition Phase, Booz, Allen & Hamilton, April 1981, Contract Number: DOTUM-60-80-C071004.

MIL-STD-882A, System Safety Program Requirements, Department of Defense, June 28, 1977.

Baltimore Region Rapid Transit System Safety Program Plan, State of Maryland Department of Transportation, December 1978.

MARTA - System Safety Program Plan, Parsons, Brinkerhoff - Quade and Douglas/Tudor Engineering Co., February 1977.

BARTD System Safety Program Plan, Bay Area Rapid Transit District, 1978.

Draft Milestone - 6 Report, Safety and Security, Dade County Transit Improvement Program, Kaiser Engineers, March 1975.

Safety and System Assurance Program Plan, Pittsburgh Light Rail Transit Reconstruction, Booz, Allen & Hamilton, April 1979.

System Safety Analysis: A Description of the Formats
and Methologies for System Safety Analysis of Fixed
Guideway Transit Systems, Booz, Allen & Hamilton,
January 1981, Contract Number: DOTUM-60-80-C071004.

California Public Utilities Code, Part 3, Southern
California Rapid Transit District.

System Design Criteria - SCRTD Metro Rail Project
Milestone Report 2.

2.0 SYSTEM DESCRIPTION

2.0 SYSTEM DESCRIPTION

2.1 History

The California State Legislature created the Southern California Rapid Transit District (SCRTD) in 1964 with a legislative mandate to design, construct and operate a rapid transit system within the Los Angeles County area. The success of such a mandate is largely dependent upon the availability of funds. On three occasions, SCRTD attempted to obtain county-wide voter approval of rapid transit funding through increases in local sales taxes. Finally, in June 1974, Proposition 5 was passed by a solid majority, allowing the use of a portion of state gasoline taxes for rapid transit development. This measure provided a local source of funds for SCRTD to begin its rail rapid transit development program in Los Angeles.

SCRTD also received federal funding in 1974 to evaluate 16 transit corridors in the metropolitan area. A Rapid Transit Advisory Committee (RTAC), composed of representatives of local and state agencies, guided this effort. This analysis identified a rapid transit corridor which justified further evaluation.

Based on the results of the RTAC study, a Regional Transit Development Program was adopted by state and local jurisdictions. In September 1976, representatives of the City of Los Angeles, Caltrans, the Southern California Association of Governments, the County of Los Angeles, and the SCRTD applied to the Urban Mass Transportation Administration (UMTA) for assistance in financing the Regional Transportation Development Program. Designed to identify transportation problems in the Los Angeles area, this four-part program covered, among other freeway transit projects, a proposed Downtown People Mover system, and an evaluation of alternative transit solutions for the Regional Core, the approximately 55-square-mile portion of the metropolitan center of Los Angeles.

The program was subsequently endorsed by the newly established Los Angeles County Transportation Commission in 1977.

Having received UMTA and Proposition 5 funds to evaluate transit corridors in 1977, the SCRTD began an in-depth analysis of eleven alternatives -- ten rail/bus combinations and a "status quo" alternative.

Concurrently, a comprehensive environmental impact analysis was conducted to examine the efforts of each of the alternatives on the affected communities. In September 1979, the District Board of Directors selected its "preferred alternative" -- an 18-mile rail rapid

transit line extending from the Central Business District through the Wilshire Boulevard area to Fairfax Avenue, and northerly through Hollywood to North Hollywood.

The results of this analytical work were published in the Final Alternatives Analysis/Environmental Impact Statement/Report and submitted to UMTA for evaluation in April 1980. Two months later, the SCRTD was allocated \$12 million from UMTA and \$3 million from local sources to begin the first phase of the 10-year project -- preliminary engineering. This phase includes additional environmental analysis and the basic work leading to final design and construction.

2.2 Physical Plant

The initial Metro Rail line will be a conventional two-track, steel wheel, steel rail system. It will be approximately 18 miles long consisting of underground trainway; it will serve the central business district, Wilshire Boulevard and the Hollywood and North Hollywood areas. Eighteen stations are presently planned with the distance between stations ranging from 0.4 miles in the downtown area to 2.5 miles through the Santa Monica mountains. A map of the proposed system is shown in Exhibit 2-1.

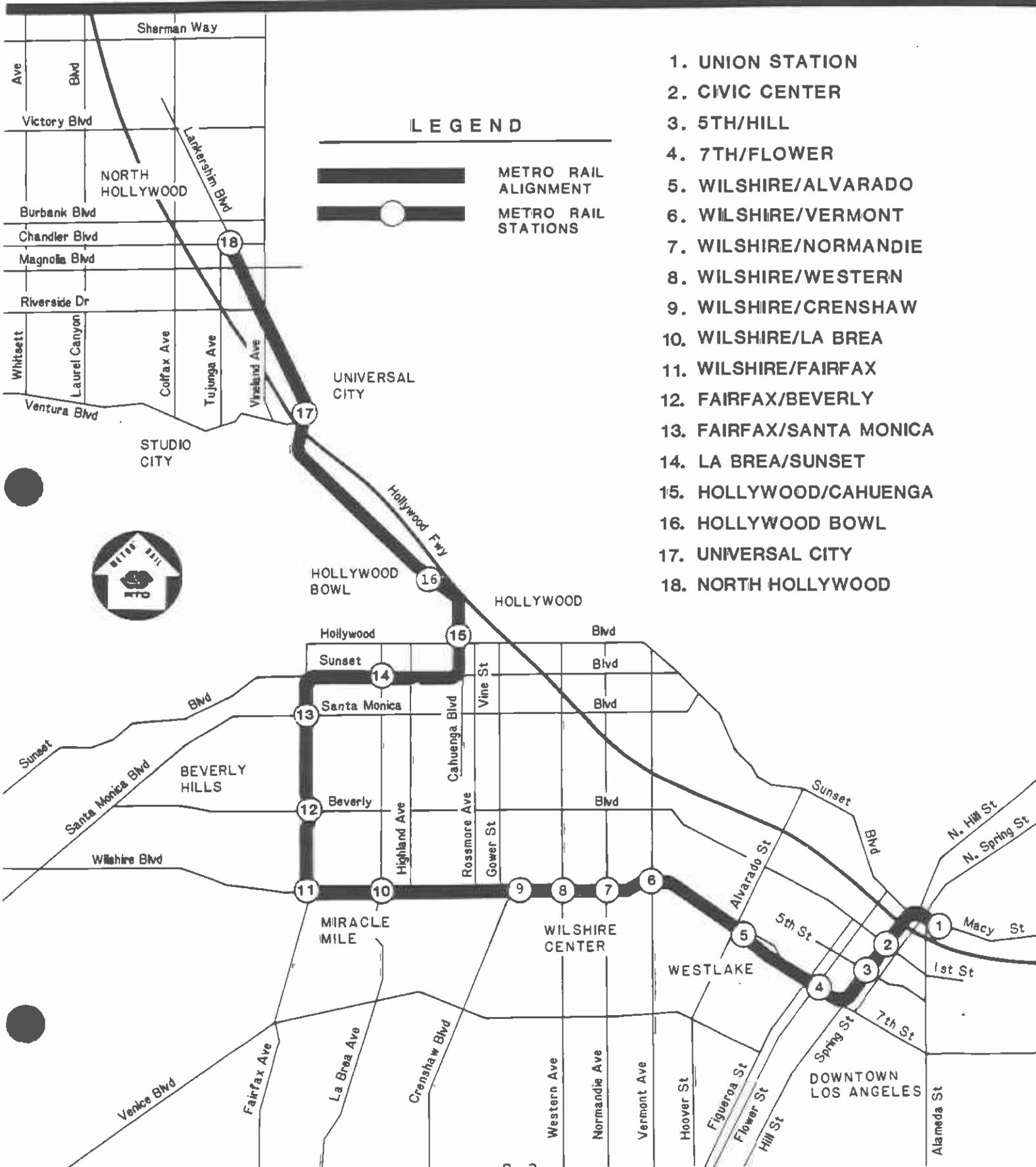
2.2.1 Stations

Stations will be subway construction with either one or two fare collection locations and with multiple entry/exit points to street level. Additional exits will be provided for use in emergencies. Escalators, stairs and elevators will provide vertical circulation between street, fare collection and platform levels, with elevator access limited to one route per station. Plans call for equipping the station for both attended and unattended operation.

Some stations will have adjacent parking facilities, pick-up/drop-off areas and/or bus pull-in areas to accommodate patrons arriving by automobile or by bus.

While station layout will not be identical, most station elements will be standardized for economy and ease of use, and to establish an identity for the system as a whole.

Southern California Rapid Transit District Metro Rail Project



LEGEND

-  METRO RAIL ALIGNMENT
-  METRO RAIL STATIONS

1. UNION STATION
2. CIVIC CENTER
3. 5TH/HILL
4. 7TH/FLOWER
5. WILSHIRE/ALVARADO
6. WILSHIRE/VERMONT
7. WILSHIRE/NORMANDIE
8. WILSHIRE/WESTERN
9. WILSHIRE/CRENSHAW
10. WILSHIRE/LA BREA
11. WILSHIRE/FAIRFAX
12. FAIRFAX/BEVERLY
13. FAIRFAX/SANTA MONICA
14. LA BREA/SUNSET
15. HOLLYWOOD/CAHUENGA
16. HOLLYWOOD BOWL
17. UNIVERSAL CITY
18. NORTH HOLLYWOOD



2.2.2 Vehicles

The passenger vehicle for the Metro Rail system will be a 75-ft.-long, standard gauge, steel wheel vehicle capable of operating at speeds up to 70 mph. The vehicles will run on 750v DC power. They will be capable of regenerative braking.

The basic unit will be a married pair, (two cars, coupled together, which share some equipment). Vehicles will operate in trains of as many as six cars. Trains will be automatically controlled with an operator performing some functions. Each vehicle will hold about 70 seated passengers, and up to about 100 standees.

Stainless steel will be used in constructing the vehicle body. Fire-resisting materials will be used throughout. The interior will include seating for able-bodied and handicapped patrons and include handholds and stanchions for standing patrons.

Vehicles will be equipped with lighting, heating, ventilating, and air conditioning apparatus to maintain a comfortable environment for passengers.

2.2.3 Track and Facilities

The main storage yard and the shop facility for the starter line will be located in the vicinity of the southeastern terminus. A limited number of storage tracks will be located near the North Hollywood terminal. Crossover tracks, storage tracks, and pocket tracks will be situated at suitable locations to enable trains to turn back at both ends of the corridor and at selected midline locations. These tracks will also provide temporary storage for malfunctioning trains, and permit reverse running during emergency situations.

2.3 Proposed Operations

A Preliminary Engineering Operating Plan⁴ was developed using the results of analysis pertaining to potential ridership projections and system characteristics.

By the year 2000, it is estimated that Metro Rail will be carrying 364,000 passengers per day. The travel patterns of Metro Rail patrons are not expected to be concentrated toward the downtown business district, nor are they expected to be heavily peaked by direction of travel or time of day. Nearly two-thirds of the Metro Rail patrons will be riding a bus to the station.

⁴ Preliminary Engineering Operating Plan Update WBS 16DAA, Booz, Allen & Hamilton, November 1983.

Operating characteristics for the year 2000 are as follows:

- o Operating hours of 20 hours per day (5:30 A.M. to 1:30 A.M.).
- o Maximum train lengths of 6 cars.
- o Minimum headways of 3 1/2 minutes between trains.
- o Maximum headways of 15 minutes between trains.
- o Peak hour travel time of 36 1/2 minutes between North Hollywood and Union Station -- an average speed of 30 mph.

The service provided in the preliminary operating plan requires a fleet of 130 vehicles, including spares.

Nothing in system design will preclude expanding service to a 24-hour operation, if desired.

A strategy for operational management under conditions other than normal will be developed as the system design progresses. Referred to as "Failure Management," the philosophy will consider:

- o Operational "Slow-Down" when required for safety or other reasons; service stoppage will be a last resort.
- o Automatically or manually initiated modifications of system operating strategies and recovery operations.
- o Communicating service disruptions, e.g., train delays and service information, to patrons.

2.4 Metro Rail Project Organization

The Metro Rail organizational structure is shown in Exhibit 2-2. The present organizational structure was established to direct the design, construction/acquisition and testing and start-up phases of the Metro Rail system. It is recognized that the Metro Rail organization structure will change to accommodate the maintenance and operations functions necessary for revenue service. Metro Rail staff involved with design decisions affecting safety, security and system assurance include System Design and Analysis, Fixed Facilities and Construction Management personnel.

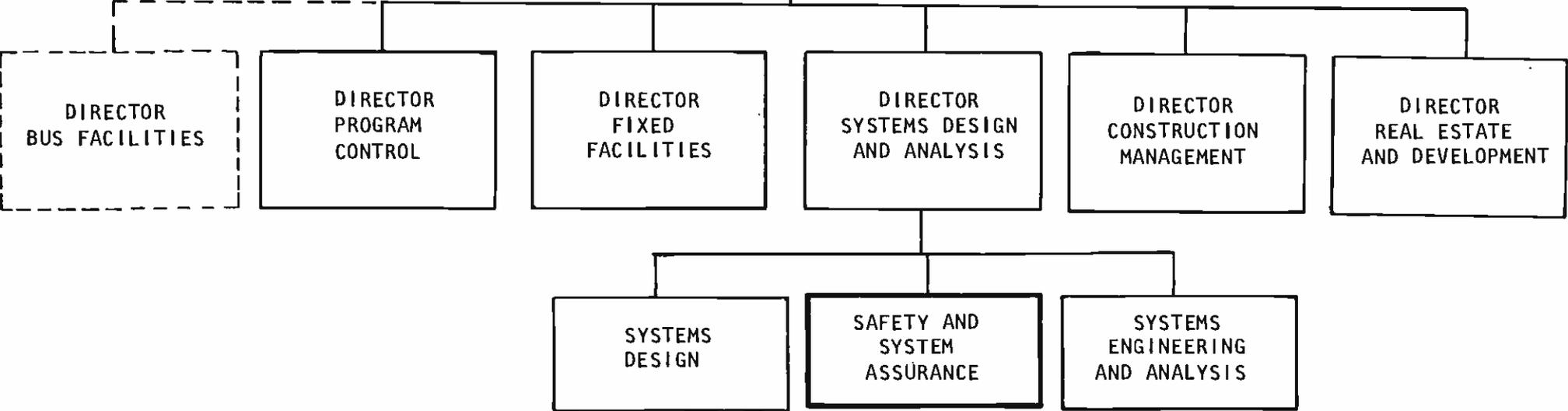
2.5 Safety Organization

The Director of Systems Design and Analysis has the responsibility for coordinating the safety-related activities of the Metro Rail Project.

SCRTD
GENERAL
MANAGER

ASSISTANT
GENERAL MANAGER
TRANSIT SYSTEMS
DEVELOPMENT

MANAGER
ADMINISTRATION



SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

METRO RAIL ORGANIZATION

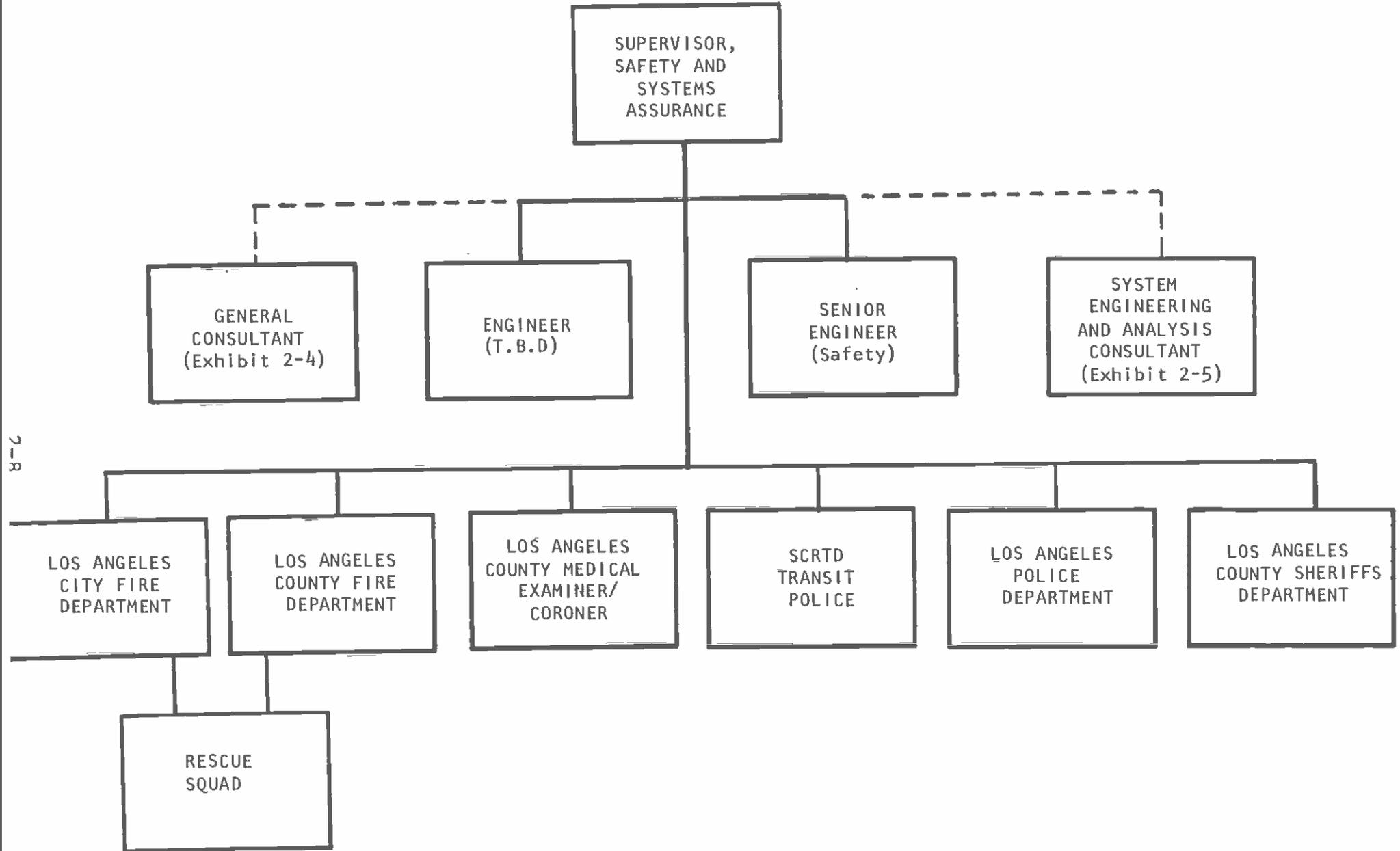
EXHIBIT 2-2

The Supervisor of Safety and System Assurance (S & SA) reports to the Director of Systems Design and Analysis. The Supervisor of S & SA directs the work of his own staff as well as consultants and fire and police organization representatives who have contracts to supply technical expertise to the Metro Rail project in their respective areas. The S & SA organization is shown in Exhibit 2-3. Exhibits 2-4 and 2-5 illustrate the organization of MRTC (General Consultant) and BAH (Systems Engineering and Analysis Consultant).

The Safety and System Assurance Organization is responsible for:

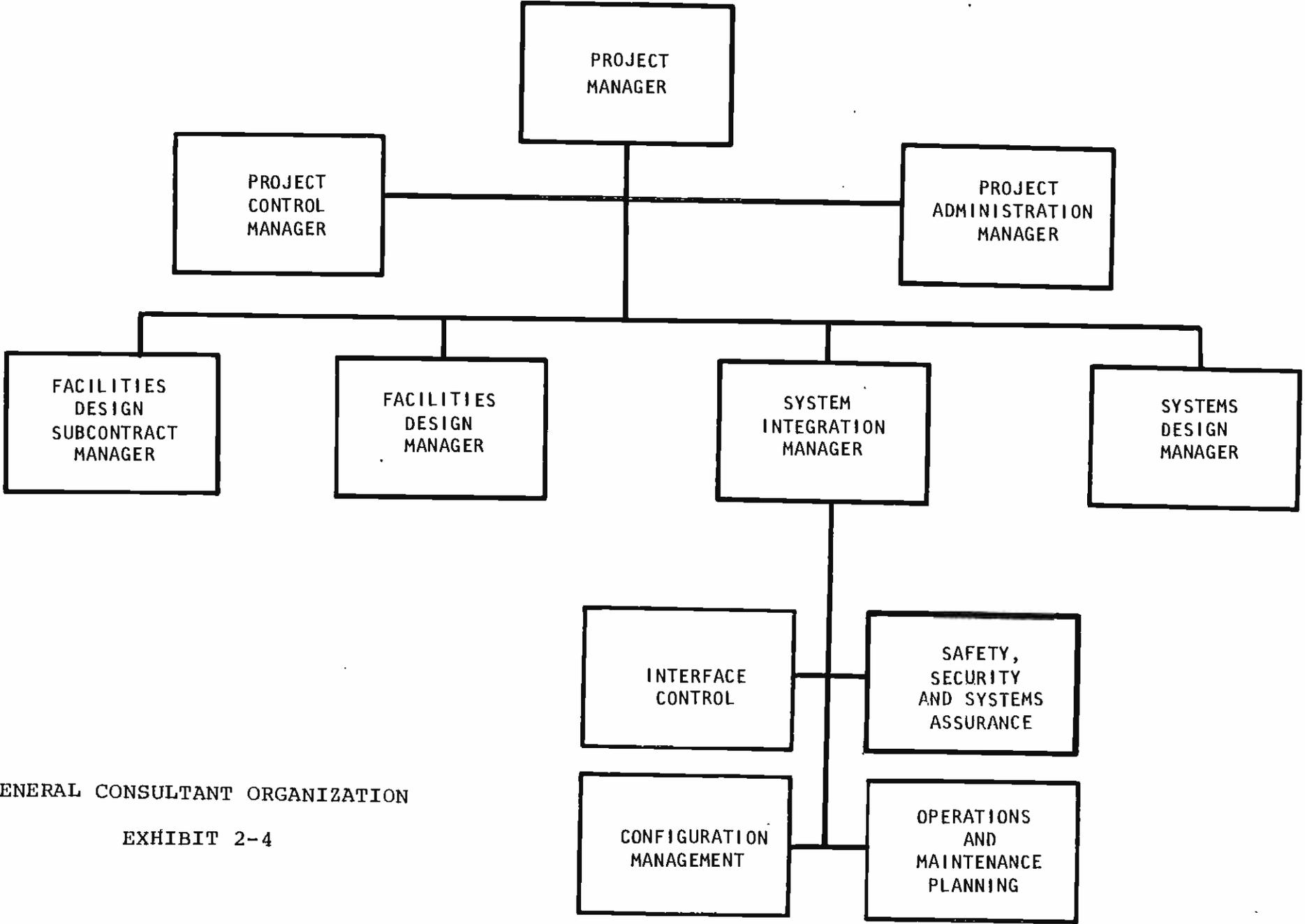
- o Organizing and coordinating the implementation of the Metro Rail safety programs.
- o Establishing safety goals and standards.
- o Overseeing, guiding and supporting activities which may be required to execute the system safety program throughout all phases of the Metro Rail Project.
- o Analyzing procedures, rules and practices to ensure adequate hazard control.
- o Participating in design reviews and planning sessions pertaining to safety, security, system assurance and training.
- o Periodically collecting safety related information from other properties to evaluate safety improvements for the Metro Rail System.
- o Auditing design changes to the system to ensure that they do not degrade the safety of the Metro Rail System.
- o Developing emergency preparedness plans and procedures for use in response to emergencies.
- o Developing the Safety Certification Plan and procedures for use in evaluating the systems readiness from a safety view.
- o Monitoring, in the test and operating phases, the reporting of accidents and failures to determine causes contributing to system deficiencies. As part of this activity, the safety specialist will conduct investigations of all accidents and/or failures within the system.
- o Informing management of the safety program status and monitoring activities.

2-8



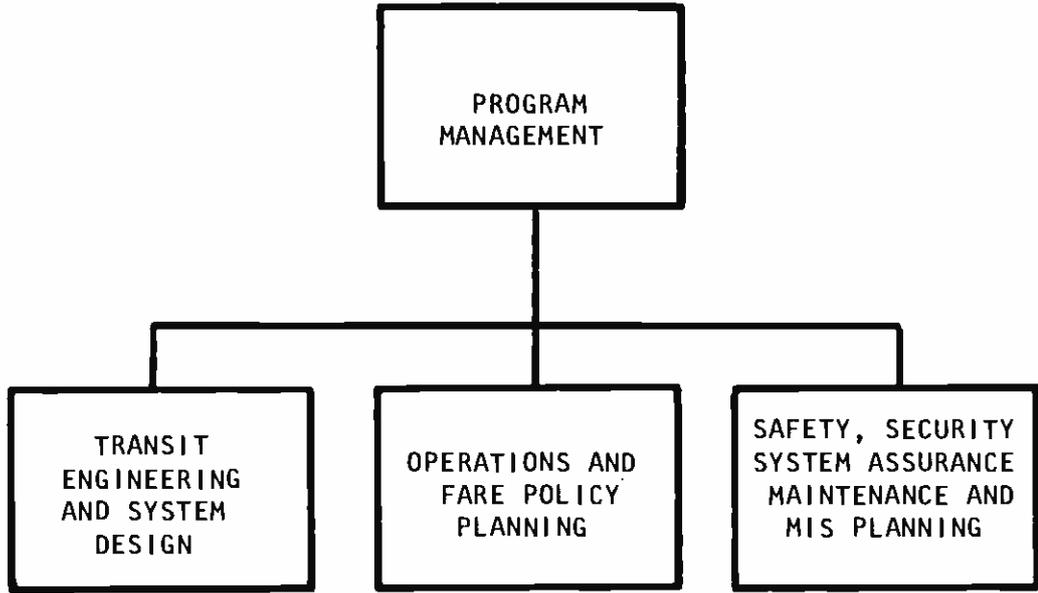
METRO RAIL SAFETY AND SYSTEM ASSURANCE ORGANIZATION

2-9



GENERAL CONSULTANT ORGANIZATION

EXHIBIT 2-4



SYSTEM ENGINEERING AND ANALYSIS CONSULTANT

EXHIBIT 2-5

3.0 FIRE/LIFE SAFETY PROGRAM TASKS

3.0 FIRE/LIFE SAFETY PROGRAM TASKS

3.1 General

The Fire/Life Safety Program focuses on the fire/life safety-related activities that are required throughout the life of the SCRTD Metro Rail system to provide for a high level of fire/life safety. The Metro Rail Program has been segmented into six phases:

- o Preliminary Engineering
- o Continuing Preliminary Engineering
- o Final Design
- o Construction/Acquisition
- o Pre-Operational Test
- o Start-Up Operations.

The elements of the Fire/Life Safety Program identify long term strategies to implement fire/life safety as a systematic process. At the same time, it delineates activities to be performed by the safety organization to ensure their involvement during the evolution of the Metro Rail System.

Another document, the System Safety Operations and Management Plan, prepared in later phases of the project, will address organizations, tasks and responsibilities for safety during revenue service operations.

The Fire/Life Safety Program Plan is a dynamic document. While the long term safety strategies remain basically constant, the short term tasks develop as the system and subsystem parameters become better defined. The Fire/Life Safety Program is periodically reviewed as the Metro Rail Project progresses. These reviews will be reflected in subsequent revisions of the System Safety Program Plan. These revisions are intended to:

- o Review progress on tasks accomplished in the prior phase.
- o Constantly refine and improve the current tasks and procedures.
- o Identify new tasks which may be required as the system progresses.
- o Explain in detail the safety related tasks, activities and responsibilities for the upcoming phase of the Metro Rail Project.

The analysis, review and revision process is the responsibility of the Metro Rail Safety and System Assurance Office with support from other groups (System Design and Analysis,

Fixed Facilities, Construction Management, General Consultant, Systems Engineering Analysis Consultant and the Fire/Life Safety Committee).

Exhibit 3-1 lists the fire/life safety task descriptions which are presently identified for each phase of the Metro Rail Project. Subsequent revisions of this document may identify other organizations responsible for accomplishing the safety tasks. Paragraph numbers in the left hand column of Exhibit 3-1 correspond to those used in this chapter.

Exhibit 3-2 identifies the organizational responsibilities for preparing, initiating, supporting and/or reviewing and commenting on each task or activity.

The tasks have been segregated into five areas, representing the major efforts of the safety organization:

- o Criteria Development
- o Plans and Procedures
- o Analyses and Studies
- o Support for Design, Construction/Acquisition, Testing and Start-Up Operations
- o Documentation.

The following sections, 3.2 thru 3.6, describe the tasks that were performed during the preliminary engineering phase and those that will be performed during continuing preliminary engineering and final design. Descriptions of the tasks to be performed in later project phases will be part of subsequent updates.

3.2 Criteria Development

3.2.1 Review All Applicable Codes, Guidelines and Regulations

During preliminary engineering, a study⁵ was performed to identify and document industry and government codes, guidelines and regulations that affect the design of the Metro Rail system. Codes, guidelines and regulations were catalogued in the areas of:

- o Passenger Vehicles
- o Electrical Power

⁵ Review of Codes, Guidelines and Regulations, WBS 12F, Kaiser Engineers, November 1982.

FIRE / LIFE SAFETY ACTIVITIES AND TASKS

PAR. NO.	FIRE / LIFE SAFETY TASK TITLE	PROJECT PHASE					
		PRELIMINARY ENGINEERING	CONTINUING PRELIMINARY ENGINEERING	FINAL DESIGN	CONSTRUCTION / ACQUISITION	PRE - OPERATIONAL TESTING	START - UP OPERATIONS
	<u>CRITERIA DEVELOPMENT</u>						
3.2.1	Review All Applicable Codes, Guidelines and Regulations	●					
3.2.2	Develop Fire/Life Safety Criteria	●					
3.2.3	Update and Revise Fire/Life Safety Criteria		●	●			
3.2.4	Conduct Peer Review on Fire Safety	●					
3.2.5	Develop Fire/Life Safety Input to Milestone Program	●					
3.2.6	Conduct Familiarization Trips to Other Transit Properties	●					

FIRE / LIFE SAFETY ACTIVITIES AND TASKS

PAR. NO.	FIRE / LIFE SAFETY TASK TITLE	PROJECT PHASE					
		PRELIMINARY ENGINEERING	CONTINUING PRELIMINARY ENGINEERING	FINAL DESIGN	CONSTRUCTION / ACQUISITION	PRE - OPERATIONAL TESTING	START - UP OPERATIONS
	<u>PLANS AND PROCEDURES</u>						
3.3.1	Prepare and Periodically Update the Fire/Life Safety Program Plan		●	●	●	●	●
3.3.2	Develop and Refine an Emergency Preparedness Plan			●	●	●	●
3.3.3	Prepare Emergency/Disaster Response Procedures			●	●	●	●
	Establish a Fire Protection Features Testing Program				●		
	Develop Fire Protection Features Test Procedures and Schedules				●		
	Develop Fire Investigation Procedures				●	●	
	Develop Hazardous Materials Maintenance Procedures				●	●	
	Prepare Fire Protection Features Inspection and Preventive Maintenance Procedures				●	●	

FIRE / LIFE SAFETY ACTIVITIES AND TASKS

PAR. NO.	FIRE / LIFE SAFETY TASK TITLE	PROJECT PHASE					
		PRELIMINARY ENGINEERING	CONTINUING PRELIMINARY ENGINEERING	FINAL DESIGN	CONSTRUCTION / ACQUISITION	PRE - OPERATIONAL TESTING	START - UP OPERATIONS
	<u>ANALYSES AND STUDIES</u>						
3.4.1	Perpare and Periodically Update Fire Hazard and Toxic Materials List(s)			●	●	●	
3.4.2	Prepare Emergency Equipment List(s)			●	●		
3.4.3	Prepare a Study of Public Firefighting Capabilities and Requirements		●				
3.4.4	Develop Safety Characteristics/ Trade Off Studies		●	●			
3.4.5	Prepare a Methane/Combustible Gases Study		●				
3.4.6	Prepare a Siesmic Risk Analysis		●				
3.4.7	Prepare and Update a Station Emergency Egress Study		●	●			

FIRE / LIFE SAFETY ACTIVITIES AND TASKS

PAR. NO.	FIRE / LIFE SAFETY TASK TITLE	PROJECT PHASE					
		PRELIMINARY ENGINEERING	CONTINUING PRELIMINARY ENGINEERING	FINAL DESIGN	CONSTRUCTION / ACQUISITION	PRE - OPERATIONAL TESTING	START - UP OPERATIONS
	<u>DESIGN, CONSTRUCTION, TEST AND OPERATIONS SUPPORT</u>						
3.5.1	Provide General Design (also Construction, Test & Operations) Support	●	●	●	●	●	●
3.5.2	Participate in Design Reviews	●	●	●	●		
3.5.3	Establish and Participate on a Fire/Life Safety Committee	●	●	●	●	●	●
3.5.4	Prepare a Fire/Life Safety Criteria Conformance Checklist		●	●			
3.5.5	Prepare Design Review, Audit and Inspection Fire/Life Safety Checklists			●			
3.5.6	Develop a Construction/Facilities Fire/Life Safety Inspection Program			●			
3.5.7	Identify Fire/Life Safety Requirements for Contract Specifications		●	●			
3.5.8	Review Contractor Analyses & Reports			●	●	●	●
3.5.9	Conduct Coordination Meetings with Contractor Fire/Life Safety and System Safety Staff			●	●	●	●

FIRE / LIFE SAFETY ACTIVITIES AND TASKS

PAR. NO.	FIRE / LIFE SAFETY TASK TITLE	PROJECT PHASE					
		PRELIMINARY ENGINEERING	CONTINUING PRELIMINARY ENGINEERING	FINAL DESIGN	CONSTRUCTION / ACQUISITION	PRE - OPERATIONAL TESTING	START - UP OPERATIONS
	<u>DESIGN, CONSTRUCTION, TEST AND OPERATIONS SUPPORT (Continued)</u> Participate in Contractors On-Site Audits Establish a Fire/Emergency Personnel Training Program Participate in Safety Curriculum Development Conduct Team Training Exercises and Drills Provide Fire/Life Safety Documentation for the Safety Certification Program <u>DOCUMENTATION</u>				●		
3.6.1	Establish Safety Library		●				
3.6.2	Establish Documentation and Review Procedures		●				
	Prepare a Fire Protection Features Manual				●	●	
	Prepare a Fire Department Communications System Handbook				●	●	
	Prepare Fire Protection Features Maintenance and Inspection Manuals				●	●	

TASK RESPONSIBILITIES

PARAGRAPH NUMBER	FIRE / LIFE SAFETY TASK / ACTIVITY	METRO RAIL								GENERAL CONSULTANT	CONSTRUCTION MANAGER	RAIL OPERATIONS	RAIL MAINTENANCE
		SYSTEM DESIGN & ANALYSIS						FIXED FACILITIES	CONSTRUCTION MANAGEMENT				
		SAFETY & SYSTEM ASSURANCE	SYSTEM ENGINEERING & ANALYSIS	SYSTEMS DESIGN	SYSTEMS ENGINEERING CONSULTANT	FIRE DEPT. AND RESCUE SQUAD	POLICE DEPTS. & CORONERS OFFICE						
	<u>CRITERIA DEVELOPMENT</u>												
3.2.1	Review All Applicable Codes, Guidelines and Regulations	RC		RC		RC		RC			P		
3.2.2	Develop Fire/Life Safety Criteria	S				S					P		
3.2.3	Update and Revise Fire/Life Safety Criteria	S				S					P		
3.2.4	Conduct Peer Review on Fire Safety	P											
3.2.5	Develop Fire/Life Safety Input to Milestone Program	P			S	S					S		
3.2.6	Conduct Familiarization Trips to Other Transit Properties	P				S					S		
												(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)	(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)

P= Primary Responsibility
 S= Support or Secondary Responsibility
 RC= Review and Comment

3-4 (a)

TASK RESPONSIBILITIES

PARAGRAPH NUMBER	FIRE / LIFE SAFETY TASK / ACTIVITY	METRO RAIL								GENERAL CONSULTANT	CONSTRUCTION MANAGER	RAIL OPERATIONS	RAIL MAINTENANCE
		SYSTEM DESIGN & ANALYSIS						FIXED FACILITIES	CONSTRUCTION MANAGEMENT				
		SAFETY & SYSTEM ASSURANCE	SYSTEM ENGINEERING & ANALYSIS	SYSTEMS DESIGN	SYSTEMS ENGINEERING CONSULTANT	FIRE DEPT. AND RESCUE SQUAD	POLICE DEPTS. & CORONERS OFFICE						
3.3.1	<u>PLANS AND PROCEDURES</u> Prepare and Periodically Update the Fire/Life Safety Program Plan	S	RC	RC	P	RC		RC	RC	RC	RC		
3.3.2	Develop and Refine an Emergency Preparedness Plan	S	RC	RC	P	S	RC	RC	RC	RC	RC		
3.3.3	Prepare Emergency/Disaster Response Procedures	P	RC	RC	RC	P	RC	RC	RC	RC	RC		
												(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)	(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)

P= Primary Responsibility
 S= Support or Secondary Responsibility
 RC= Review and Comment

3-4 (b)

TASK RESPONSIBILITIES

PARAGRAPH NUMBER	FIRE / LIFE SAFETY TASK / ACTIVITY	METRO RAIL								GENERAL CONSULTANT	CONSTRUCTION MANAGER	RAIL OPERATIONS	RAIL MAINTENANCE
		SYSTEM DESIGN & ANALYSIS						FIXED FACILITIES	CONSTRUCTION MANAGEMENT				
		SAFETY & SYSTEM ASSURANCE	SYSTEM ENGINEERING & ANALYSIS	SYSTEMS DESIGN	SYSTEMS ENGINEERING CONSULTANT	FIRE DEPT. AND RESCUE SQUAD	POLICE DEPTS. & CORONERS OFFICE						
	<u>ANALYSES AND STUDIES</u>												
3.4.1	Prepare and Periodically Update Fire Hazard and Toxic Materials List (s)	S		RC	RC	S		RC	RC	P			
3.4.2	Prepare Emergency Equipment List (s)	S				P				S			
3.4.3	Prepare a Study of Public Firefighting Capabilities and Requirements	RC						RC		P			
3.4.4	Develop Safety Characteristics/Trade Off Studies	P	RC	RC	S	RC	RC	RC		S			
3.4.5	Prepare a Methane/Combustible Gases Study	RC						RC	RC	P			
3.4.6	Prepare a Siesmic Risk Analysis	RC						RC	RC	P			
3.4.7	Prepare and Update a Station Emergency Egress Study	RC						RC	RC	P			
												(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)	(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)

P= Primary Responsibility

S= Support or Secondary Responsibility

RC= Review and Comment

Exhibit 3-2

TASK RESPONSIBILITIES

PARAGRAPH NUMBER	FIRE / LIFE SAFETY TASK / ACTIVITY	METRO RAIL								GENERAL CONSULTANT	CONSTRUCTION MANAGER	RAIL OPERATIONS	RAIL MAINTENANCE
		SYSTEM DESIGN & ANALYSIS						FIXED FACILITIES	CONSTRUCTION MANAGEMENT				
		SAFETY & SYSTEM ASSURANCE	SYSTEM ENGINEERING & ANALYSIS	SYSTEMS DESIGN	SYSTEMS ENGINEERING CONSULTANT	FIRE DEPT. AND RESCUE SQUAD	POLICE DEPTS. & CORONERS OFFICE						
	<u>DESIGN SUPPORT</u>												
3.5.1	Provide General Design Support	P			S	S							
3.5.2	Participate in Design Reviews	P			S	S				S	S		
3.5.3	Establish and Participate on a Fire/Life Safety Committee	P			S	S				S	S		
3.5.4	Prepare a Fire/Life Safety Criteria Conformance Checklist	S	RC	RC	RC	S		RC		P	RC		
3.5.5	Prepare Design Review, Audit and Inspection Fire/Life Safety Checklists	P	RC	RC	RC	S				RC	RC		
3.5.6	Develop a Construction/Facilities Fire/Life Safety Inspection Program	P				S		S	S	RC	RC		
3.5.7	Identify Fire/Life Safety Requirements for Contract Specifications	S		S	RC	S				P			
3.5.8	Review Contractor Analyses and Reports	P		S	S	S				S	S		
3.5.9	Conduct Coordination Meetings with Contractor Fire/Life Safety and System Safety Staff	P				S				S	S		
												(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)	(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)

P= Primary Responsibility
 S= Support or Secondary Responsibility
 RC= Review and Comment

3-4 (P)

EXHIBIT 3-2
TASK RESPONSIBILITIES

PARAGRAPH NUMBER	FIRE / LIFE SAFETY TASK / ACTIVITY	METRO RAIL								GENERAL CONSULTANT	CONSTRUCTION MANAGER	RAIL OPERATIONS	RAIL MAINTENANCE
		SYSTEM DESIGN & ANALYSIS						FIXED FACILITIES	CONSTRUCTION MANAGEMENT				
		SAFETY & SYSTEM ASSURANCE	SYSTEM ENGINEERING & ANALYSIS	SYSTEMS DESIGN	SYSTEMS ENGINEERING CONSULTANT	FIRE DEPT. AND RESCUE SQUAD	POLICE DEPTS. & CORONERS OFFICE						
3.6.1	<u>DOCUMENTATION</u> Establish Safety Library	P											
3.6.2	Establish Documentation and Review Procedures	P								S		(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)	(TASKS TO BE ASSIGNED FOR FUTURE PROJECT PHASES)

P= Primary Responsibility
 S= Support or Secondary Responsibility
 RC= Review and Comment

3-4 (e)

- o Elevators and Escalators
- o Communications
- o Automatic Train Control.

3.2.2 Develop Fire/Life Safety Criteria

Fire/Life Safety Criteria⁶ have been developed during preliminary engineering. The Fire/Life Safety Criteria provide the requirements to be followed by design engineers to properly select equipment and to design facilities. Through the criteria, fire/life safety will be integrated into all aspects of the design, specification preparation, equipment selection, construction, architectural concepts, procedures and operations.

Systemwide safety criteria⁷ have also been developed which specifically addresses system safety characteristics of the Metro Rail design as they pertain to operational safety procedures.

3.2.3 Update and Revise Fire/Life Safety Criteria

During the design process, changes may be made to the Fire/Life Safety Criteria based on results of studies and alternatives analysis. The Fire/Life Safety Criteria will be revised in accordance with established Metro Rail document control and configuration management practices.

3.2.4 Conduct Peer Review on Fire Safety

As part of the development of the Fire/Life Safety Criteria, industry peer comments were solicited from knowledgeable sources. A Fire Safety Peer Review Workshop⁸ was held at the SCRTD on October 14-15, 1981.

Participants during the review included the SCRTD, California PUC, the Los Angeles Fire Departments, as well as transit safety experts from Atlanta, Washington, Montreal, PATH, San Francisco, UMTA and Booz, Allen.

6 Metro Rail Fire/Life Safety Criteria, SCRTD Metro Rail System Design Criteria, Volume I, Section 2, November 18, 1983.

7 Metro Rail Safety Criteria, WBS 13DAD, Booz, Allen & Hamilton and Kaiser Engineers, September 1982.

8 SCRTD Peer Review Workshop on Fire Safety, October 14-15, 1981, Charles Harris, Inc.

3.2.5 Develop Fire/Life Safety Input to Milestone Program

As part of the Metro Rail public involvement and Milestone program, a chapter on fire/life safety was incorporated into Milestone 7.⁹ It described the SCRTD's comprehensive fire/life safety program in the areas of Stations, Trainways, Passenger Vehicles, Ventilation Systems, Communications, Vehicle Yard and Maintenance Facilities, F/LS Emergency Procedures, Central Control Facility, and Operational Procedures and Training. The Milestone Report was adopted by the Board of Directors in March, 1983.

3.2.6 Conduct Familiarization Trips to Other Transit Properties

In preparation for development of the Fire/Life Safety Criteria, members of the SCRTD Fire/Life Safety Committee visited other rapid transit systems in the United States and Canada. In addition, members of the F/LS Committee also participated as observers in disaster drills at BART and WMATA.

⁹ Safety, Fire/Life Safety, Security and Systems Assurance, March 1983, (Chapter III).

3.3 Plans and Procedures

3.3.1 Prepare and Periodically Update the Fire/Life Safety Program Plan

Based on Metro Rail program goals and objectives for a safe system, the SCRTD is developing this Fire/Life Safety Program Plan. It defines the management and technical tasks that will be performed for each project phase.

3.3.2 Develop and Refine an Emergency Preparedness Plan

Successful response to, and management of, emergencies is largely dependent on adequate preparation. The SCRTD will anticipate and plan for emergency situations through development of emergency procedures. The procedures will be contained in an Emergency Preparedness Plan (EPP). The EPP will include those items identified in the Fire/Life Safety Criteria, Sections 2.6.3.1, 2.6.3.2 and 2.6.2.1. A preliminary version of the EPP will be prepared during final design and refined in each subsequent phase of the project.

3.3.3 Prepare Emergency/Disaster Response Procedures

Detailed procedures for each type of emergency listed in the EPP must be developed, reviewed, integrated and rehearsed. All Metro Rail program participants will provide input to the procedures. These participants include representatives of the Fire Department staff, Police Department staff, the Coroner's Office staff, and SCRTD staff.

3.4 Analyses and Studies

As part of the system configuration and design process, it is necessary to identify potential fire, seismic, or toxic material hazards and recommend corrective actions to mitigate the hazards. In the preliminary stages of Metro Rail design, these analyses can only be scoped in a broad manner because the details of the subsystems are not known. Even at this early stage, however, analyses are useful because they identify potential problem areas. The System Safety Program Plan delineates the development of several safety analyses, including:

- o A Preliminary Hazard Analysis
- o System, Subsystem and Interface Hazard Analyses
- o Fault Tree Analyses
- o A Critical/Catastrophic Items List.

As input to these system safety hazard analyses, several studies and analyses that focus on fire/life safety issues were/will be conducted. These include preparation of:

- o Fire Hazard and Toxic Materials List(s)
- o Emergency Equipment List(s)
- o A Methane/Combustible Gases Study
- o A Seismic Activity Study
- o A Fire Fighting Capabilities Study.

3.4.1 Prepare and Periodically Update Fire Hazard and Toxic Materials List(s)

A list of all potentially hazardous materials used for Metro Rail construction or equipment, as well as for maintenance, will be prepared and periodically updated. The lists will be prepared as part of the design review process, and used by F/LS personnel to evaluate candidate materials for fire/life safety implications. The list(s) will identify the potentially hazardous effects of various materials, including solvents, insulation, finishes, sealants, coatings, adhesives, etc. used in the Metro Rail system.

3.4.2 Prepare Emergency Equipment List(s)

To properly plan for and manage emergencies, and as input to the procurement process, the F/LS Committee will identify emergency equipment requirements. The lists will define what equipment is to be purchased for each station, the Central Control Facility, each appropriate local fire-house, kept on-board the vehicles, at the yard and shop, etc., how and where it is to be stored and who controls access to it. This emergency and fire fighting equipment is in addition to the ventilation, fire protection, control and communications systems installed as part of the fixed facilities.

3.4.3 Prepare a Study of Public Firefighting Capabilities and Requirements

A study¹⁰ was performed to determine the fire response capabilities of the Los Angeles City and County Fire Departments to provide fire protection, rescue and medical services for potential emergencies that may occur on Metro Rail. The need for providing additional personnel and equipment was evaluated. The study surveyed fire suppression/medical aid equipment, training, communication, and fire prevention inspection programs.

3.4.4 Develop Safety Characteristics/Trade-Off Studies

During the design process, situations may arise where trade-offs between safety, security and system assurance considerations must be addressed. The safety organization will coordinate with the security and system assurance organizations as well as outside agencies, such as the fire and police departments and PUC to resolve these issues. The resolution of these trade-offs will be presented to the design groups and Metro Rail management for approval and design implementation.

3.4.5 Prepare a Methane/Combustible Gases Study

A study¹¹ was conducted to determine whether or not a methane gas problem could exist for the Metro Rail system, to determine its magnitude, and to develop solutions to avoid or mitigate potential hazards. The report analyzed geological data, the anticipated performance of structures, equipment and systems and the projected operation of the transit system.

3.4.6 Prepare a Seismic Risk Analysis

A study¹² was conducted to evaluate the consequences to the Metro Rail system and its patrons of various seismic events. Failure effects were evaluated for tunnels, stations, elevators, escalators, fare collection, auxiliary power and ventilation equipment, tracks and switches, traction power, train control, vehicles and communications systems.

¹⁰ Study of Public Fire Fighting Capabilities and Requirements for the Metro Rail Project, Kaiser Engineers and Gage-Babcock & Associates, August, 1983.

¹¹ Study of Methane and Other Combustible Gases Effect on Underground Operation of the Metro Rail Project, Kaiser Engineers California and Gage-Babcock & Associates, March 1983.

¹² Seismic Risk Analysis, WBS 12AAM, Lindvall-Richter and Associates, October 1982.

3.4.7 Prepare and Update a Station Emergency Egress Study

There was no single accepted standard to define the proper number of exits required for emergency evacuation of a subway station. The F/LS Committee analyzed existing codes and standards and found that a combination of various codes and standards provided the most appropriate and cost effective approach toward determining exiting needs for postulated emergencies. A Station Emergency Egress Study¹³ was prepared to analyze whether the station emergency exiting criteria were adequate and achieved exit requirements and objectives. The study will be updated during final design.

3.5 Design Support

The safety organization will participate directly and continuously with the General Consultant and section designers to assure that safety is adequately considered in the system and subsystem designs and procurement specifications. The safety organization will support the designers in the manner described in the following sections.

3.5.1 Provide General Design Support

The safety organization is responsible for providing fire/life information and analysis pertinent to safety in the system and subsystem design. The information provided will include:

- o Documentation and data significant to fire/life safety in the design of other transit properties facilities and equipment(s).
- o The resulting compromises achieved by the coordination of safety, security and system assurance considerations which impact on the system and subsystem designs and specifications.

3.5.2 Participate in Design Reviews

The safety organization will participate in all design reviews where the fire/life safety of patrons, Metro Rail personnel, equipment or facilities could be affected by the design of the system. These reviews include Preliminary Design Reviews and Final Design Reviews. The results of the design reviews will be documented and action items assigned to resolve deficiencies.

¹² Station Emergency Egress Study, WBS 13DAK, Volumes I and II, Harry Weese and Associates/Tibbets, Abbott, McCarthy & Stratton, August 1983.

3.5.3 Establish and Participate on a Fire/Life Safety Committee

To insure supportive interaction between the Metro Rail safety organization, their consultants, and police and fire organizations, a Fire/Life Safety Committee was established. The organization of the Fire/Life Safety Committee is shown in Exhibit 3-3 and charter in Exhibit 3-4. Along with its other coordinating responsibilities, the Committee acts as a review board of the activities, analyses and reports generated on safety issues. The Committee recommends necessary changes, additions, and/or improvements to on-going safety activities.

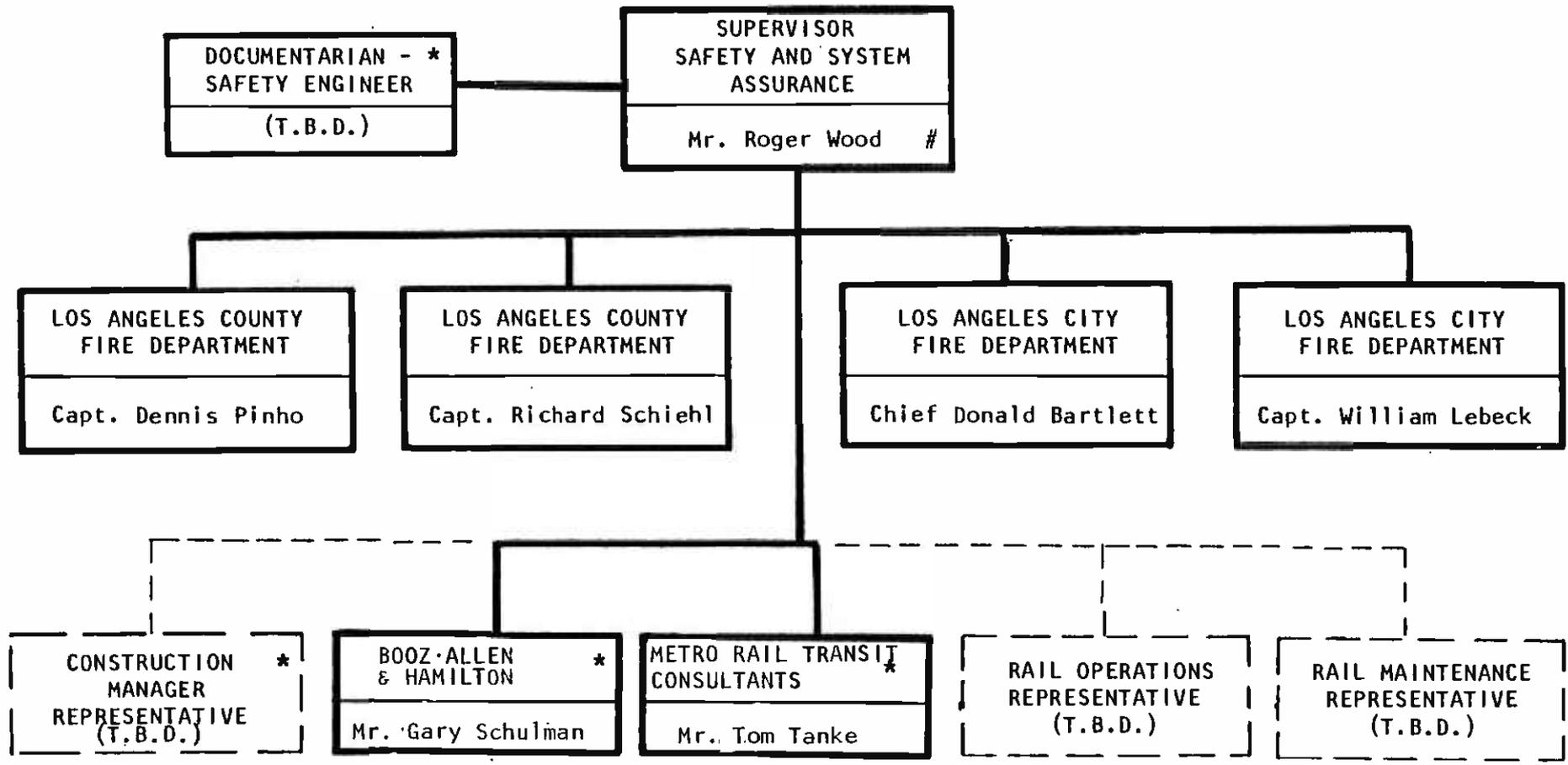
The Fire/Life Safety Committee meets on a periodic and scheduled basis. It will function throughout the design, construction/acquisition, testing and revenue operation phases of the Metro Rail Program. Its safety emphasis will shift from design review in the early stages of the Metro Rail Program to the development and improvement of safety procedures in the construction/acquisition phase to investigation and reporting of accidents and incidents in the revenue operating phase.

3.5.4 Prepare a F/LS Criteria Conformance Checklist

To assure that fire/life safety criteria are properly reflected in contract drawings and procurement specifications, the safety organization will develop a comprehensive checklist of items which must be verified during the Metro Rail design review program. The checklists will be used by the F/LS Committee members to assure a comprehensive and consistent review of specifications and drawings. Any discrepancies will be formally submitted to the General Consultant and will be resolved to the satisfaction of the Fire/Life Safety Committee.

3.5.5 Prepare Design Review, Audit and Inspection F/LS Checklists

To assure that fire/life safety criteria incorporated into the specifications are reflected in suppliers final designs, equipment and materials selection, the safety organization will refine those checklists developed in 3.5.4 above, and reuse them for the procurement phase. The checklists will be incorporated into the Metro Rail design review, audit and inspection program. The checklists will be prepared by the F/LS Committee and used by the F/LS Committee representatives during supplier design reviews, audits and inspections. Any fire/life safety discrepancies between the specification checklists and suppliers designs will be resolved to the satisfaction of the Fire/Life Safety Committee.



* Non Voting Members

Mr. William Rhine, Alt. Chairman

SCRTD METRO RAIL FIRE/LIFE SAFETY COMMITTEE

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

METRO RAIL PROJECT

- FIRE/LIFE SAFETY COMMITTEE CHARTER

WHEREAS, the route alignment selected as the Metro Rail System preferred alternative extends through geographic areas within both the City of Los Angeles and Los Angeles County, each of which has separate and distinct fire service districts and separate building codes,

WHEREAS, it has been proven that experience gained from other municipalities who have built transit systems indicates the need for the continuous interchange of information between the fire district and the transit system's designers to establish a commonality of purpose, maintain efficient channels of communication and to input design preferences early in the design process,

BE IT RESOLVED THAT:

A permanent Fire/Life Safety Committee (hereafter referred to as the "Committee") is established to facilitate the interchange of information, make evaluations and recommendations, and set requirements relative to the design, construction, and operation of a rail rapid transit system for the purpose of minimizing the fire and life safety hazards to patrons, employees, and property.

The Committee will be comprised of representatives from the City of Los Angeles Fire Department, the Consolidated Fire Protection District of Los Angeles County, a representative of the General Consultant, and a representative of the Southern California Rapid Transit District, who will act as chairman of the Committee.

Pro-Tem members of the Committee will be a representative from the Los Angeles City Police Department, a representative from the Los Angeles County Sheriff's Department, a representative from the SCRTD Fixed Facilities Division and a representative from the Systems Engineering and Analysis Consultant.

The Committee will provide input to and comments on the fire protection criteria, emergency preparedness plans, and safety and security plans.

The Committee will establish requirements relative to fire and life safety using national standards, jurisdictional laws, codes, and ordinances, as guidelines.

The Committee will prepare "Fire Protection and Safety Agreements" for ratification by the participating agencies.

09/08/83
S&S-24.6

The Committee will provide a means for soliciting and gaining the understanding and cooperation of the various public service departments within the City and County of Los Angeles during the design and construction of the Metro Rail System.

The signatures below indicate agreement with the Fire/Life Safety Committee Charter between the City of Los Angeles Fire Department, Consolidated Fire Protection District of Los Angeles County and the Southern California Rapid Transit District - Metro Rail Project.

City of Los Angeles Fire Department

Consolidated Fire Protection District
of Los Angeles County

Southern California Rapid Transit
District/Metro Rail Project

3.5.6 Develop a Construction/Facilities F/LS Inspection Program

During final design, the F/LS Committee will develop a program to assure that stations, tunnels and other facilities are being constructed in accordance with requirements of the Fire/Life Safety Criteria and the appropriate specification and drawing requirements relating to fire/life safety. The Construction Manager will be encouraged to utilize the expertise of F/LS Committee members, as appropriate, for the development of the inspection program.

3.5.7 Identify Fire/Life Safety Requirements for Contract Specifications

The safety organization is responsible for identifying contractor or supplier fire/life safety-related analyses, tests, tasks, and submittals that form part of the procurement specifications. The safety organization will assist the General Consultant in identifying and phrasing the requirements for fire/life safety analyses, test requirements and submittals in the procurement specifications.

3.5.8 Review Contractor Analyses and Reports

The safety organization will review any contractor analyses, reports, and submittals relating to fire/life safety. This includes change proposals, hazard analyses, critical/catastrophic items lists, fault tree analyses, etc.

3.5.9 Conduct Co-ordination Meetings with Contractor F/LS and System Safety Staff

The SCRTD will co-ordinate fire/life safety and system safety planning with cognizant representatives of Metro Rail equipment suppliers, facility contractors and subcontractors. Effective co-ordination will assure that relevant fire/life safety criteria are incorporated into all system elements.

3.6 Documentation

As part of its activities, the safety organization will organize and maintain safety-related documentation as part of a Safety, Security and System Assurance library.

3.6.1 Establish Safety Library

The organization and maintenance of a safety-related library of Metro Rail data and other rapid rail properties data will be a continuing activity. The safety-related data bases will provide:

- o Archival data of other properties' reports, records, and statistics (as it can be obtained).
- o Monitoring status records of contractors' analyses, tasks, test certifications, etc.
- o Qualitative data for investigation of incidents/accidents and quantitative data for statistical analysis of types of incidents/accidents.
- o The source data for a management information reporting system.

3.6.2 Establish Documentation and Review Procedures

The safety organization will prepare procedures to review, comment on and track changes to fire/life safety and other related documentation. This will include:

- o The internal and contractor provided safety-related analyses.
- o The resolution of all hazards itemized in the Critical/Catastrophic Items List.
- o Status reports of all contractor(s)' safety-related analyses.
- o Incident/accident reports of all construction test and operational anomalies.
- o Test and safety certification status.
- o Status of safety training programs for operators, maintenance personnel, central control personnel, and station agents (if used).