SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

METRO RAIL PROJECT

SAFETY CERTIFICATION METHODOLOGY
WBS 06

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Prepared by

BOOZ·ALLEN & HAMILTON Inc.
Transportation Consulting Division
523 West Sixth Street, Suite 502
Los Angeles, California 90014

2869171

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1.0 INTRODUCTION

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The SCRTD has established a comprehensive safety program for the Metro Rail project. The program is documented in the SCRTD's System Safety and Security Program Plan.* The program plan identifies the technical and management activities performed during each project phase to assure safety is systematically integrated into all design, procurement, testing and system start-up activities. A major activity required by the System Safety and Security Program Plan is the development of a safety certification program. The focus of the safety certification program is on documenting that:

- Comprehensive safety criteria are developed based both on industry experience, codes, and regulations, and on special studies and analyses of conditions unique to the Metro Rail environment
- The criteria are properly reflected in all directive drawings and contract documents, requiring that appropriate safety features be designed into Metro Rail facilities and equipment
- Changes to the design are reviewed for safety implications
- The safety features required by contract are properly included in the finished product(s)
- The equipment and facilities are tested and inspected and the safety features perform as the design intended

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* System Safety and Security Program Plan, Final Design Edition, Booz, Allen & Hamilton, August 1984 (draft).

- A comprehensive system verification and testing program is developed which includes safety testing and verification of all facilities and equipment, and the capability of personnel to deal with all normal, abnormal, and emergency conditions

- Emergency preparedness plans and procedures are developed to assure that SCRTD and outside agency response is coordinated and tested

- Any hazards that become apparent during design reviews, audits, inspections or system testing are resolved, either by redesign or by implementation and enforcement of special procedures.

1.1 GOALS OF SAFETY CERTIFICATION

The overall objective of the Metro Rail Safety Certification Program is to provide sufficient evidence that the system is operationally safe and that all safety requirements have been adhered to. Toward this end, the certification program must achieve the following goals:

- Identify and document design decisions involving safety

- Provide a formalized approach toward the certification process which is sufficiently documented to verify compliance with safety requirements

- Encourage the identification of safety issues

- Assure that safety is an integrated part of design reviews, inspections, audits, testing, and operations

- Assure that the SCRTD and outside agencies are prepared to respond to normal, abnormal, and emergency situations

- Provide senior management with information on the progress of safety certification in a timely manner

- Assure that safety decisions are made by responsible SCRTD management

- Provide periodic reports to the California Public Utilities Commission (CPUC) on the status of the certification program.

Safety certification may be defined as the process of verifying satisfactory compliance with a set of formal safety requirements. The focus of the safety certification program is to document that:

- Safety requirements designed into Metro Rail are, in fact, incorporated into the final product
- Critical safety activities are accomplished
- Responsible program participants certify the above in writing.

1.2 SCOPE

The SCRTD Metro Rail Safety Certification Program includes:

- Verification that safety requirements of the design criteria are reflected in the contract specifications and directive drawings
- Verification that facilities and equipment have been constructed, manufactured, inspected, and tested in accordance with the safety requirements in the contract specifications
- Verification that safety related system-level tests have been conducted, and that the SCRTD and outside agencies are adequately coordinated for proper response to emergencies
- Verification that the necessary operations, maintenance, safety, security, and systems assurance plans and procedures have been developed to assure safety program objectives are achieved.

The program scope encompasses safety certification of equipment, facilities, plans and procedures in the following areas:

- Systemwide Elements--Which include the passenger vehicles, train control system, communications, fare collection, traction power, supervisory, control and data acquisition, fire protection and suppression systems, and auxiliary vehicles.
- Fixed Facilities--Which include stations, tunnel segments, the yard and shop(s), and the Central Control Facility (CCF). Equipment installed in a station such as HVAC equipment, escalators and elevators, lighting, etc., is considered part of the facility.

- Safety, Security, System Assurance, Operational, and Maintenance Plans and Procedures--Which include items such as the Emergency Preparedness Plan, Training Programs, Accident/ Incident Investigation and Reporting Procedure, the Operators Rulebook, Standard Operating Procedures, etc.

The safety certification program permits the SCRTD to assure itself and the CPUC that the system can operate safely. It is recognized that periodic reassessments of safety certification should continue throughout the life of the system, particularly when modifications are made and/or system extensions occur.

"Safety" is defined to include fire/life safety, operational and system safety, and employee occupational safety during revenue service. Construction safety requirements, covered by the Federal and California Occupational Safety and Health Administration, are the responsibility of contractors and are not included in this certification program.

1.3 CERTIFICATION BASELINES

The safety certification program has four major ingredients, which form the baselines for certification requirements.

- The Metro Rail System Design Criteria and Standards* are used as the basis for evaluating whether all safety requirements in the contract specifications comply with the intended design.

- The contract specifications are used as the basis for evaluating whether the safety features of the end products comply with the specifications.

- The System Verification and Testing Plan, which covers both functional and safety tests, is used as the basis for determining that safety related tests have been conducted and that all facilities, equipment, and procedures can function safely together in revenue service.

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* SCRTD Metro Rail System Design Criteria and Standards, Volume 1, Chapters 2, 3, 4, 5

- The System Safety and Security Program Plan* is used as the basis to assure that safety plans and procedures are appropriately developed, reviewed, approved, and implemented.

1.4 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 California Public Utilities Commission (CPUC) to provide oversight and regulate the safety aspects of the transit property. Under this authority, the CPUC 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.

Other state and local agencies with some level of responsibility and/or authority over safety-related activities, procedures, and equipment include the California Occupational Safety and Health Administration (Cal/OSHA), under California Administrative Code (C.A.C.) Title 8, and the city and county fire departments. Cal/OSHA has regulatory and enforcement powers over construction activities. The fire jurisdictions, under C.A.C. Title 19, have jurisdiction over fire and panic safety. The proposed NFPA 130 (Standard for Fixed Guideway Transit System) is used for guidance only; the Fire/Life Safety Committee** has established the Metro Rail fire and life safety criteria, which form the basis for fire/life safety considerations.

Because the Metro Rail Program is partially federally funded, all program planning, including system safety, falls under the purview of the Urban Mass Transportation Administration (UMTA) and is subject to their review. The National Transportation Safety Board (NTSB) has the responsibility and authority to conduct investigations of transportation accidents and to make recommendations.

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* System Safety and Security Program Plan (SSSPP) - Final Design Edition, Booz, Allen & Hamilton, January 1985

** Ibid., pages 3-22 and 3-23.

1.5 RESPONSIBILITIES

The SCRTD will be responsible for the safe and dependable operation of Metro Rail and for implementing and enforcing a successful safety certification program. Consultants and contractors will provide support, as necessary. The CPUC will provide oversight and guidance to the program in those areas where they have the legislative mandate to do so.

The present responsibility for directing and enforcing the safety certification program rests with the Systems Design and Analysis Department of Transit Systems Development (TSD) of the SCRTD. Within the Systems Design and Analysis Department, the Safety and Systems Assurance Office has responsibility for the administration and management of the program on a daily basis.

General responsibilities for the Safety Certification Program are summarized in Exhibit 1-1. Specific responsibilities for accomplishing certification tasks will be detailed in the Safety Certification Plan, prepared later in the final design phase.

1.6 SAFETY CERTIFICATION PROGRAM DEVELOPMENT

The Safety Certification Program will be incrementally developed in three steps, through three project phases:

- Safety Certification Methodology--Continuing Preliminary Engineering Phase
- Safety Certification Plan--Final Design Phase
- Safety CertificationProcedures--Construction/Acquisition Phase.

The three-step approach will assure that the program is developed in a coordinated manner. Program participants will agree on the process described in each step before proceeding forward. The Safety Certification Methodology is intended to outline the approach towards certification, the general responsibilities of parties involved and a plan of action to further develop the program. The Safety Certification Plan, to be developed during Final Design, will provide a more detailed treatment of specific responsibilities of the program participants, and develop forms and documentation requirements. Safety Certification Procedures will be prepared during the Construction/Acquisition phase, to coordinate efforts with design reviews, inspections, audits, tests, and system verification efforts.

EXHIBIT 1-1
Summary of Safety Certification Responsibilities

Organization	Responsibilities
SCRTD	
• Supervisor of Safety and Systems Assurance	Administration, enforcement and management of the Program on a daily basis
• Director of Systems Design and Analysis	Overall direction and implementation of the Program; Assures systems design complies with applicable criteria
• Director of Transit Facilities Design	Assures fixed facility design complies with applicable criteria
• Director of Construction Mgmt.	Assures construction and procurements comply with applicable specifications
• Assistant General Manager - TSD	Approves final certification documents
• General Manager	Approves Metro Rail to begin revenue service
California Public Utilities Commission	Provides oversight and guidance to the program pertaining to safety appliances and procedures
Fire/Life Safety Committee Security Subcommittee Rail Operations Committee Maintenance Committee	Provides technical support and reviews documentation in their relevant area
Safety Review Team (see Section 1.7)	Reviews documentation and recommends to Metro Rail management that each system element be certified
Consultants	
• General Consultant	Develops Criteria Conformance Checklists Develops Specification Conformance Checklists
• Construction Manager	Provides documentation that safety requirements are achieved
• Systems Engineering and Analysis Consultant	Provides program development support and independent evaluation

After the SCRTD has completed each of the above documents, they will be presented to the CPUC for review and comment pertaining to their jurisdiction over "safety appliances and procedures." Upon satisfactory resolution of comments between the SCRTD and CPUC, the CPUC will be expected to formally concur with the safety certification program.

1.7 SAFETY REVIEW TEAM

A group of knowledgeable personnel shall be assembled to function as a Safety Review Team (SRT). The team will be responsible for safety review, compliance assessment, and making recommendations to SCRTD management regarding safety certification of system elements. These individuals will be identified in the Safety Certification Plan. They shall have specific expertise in a safety-related function and represent the following SCRTD Metro Rail functions:

- Safety and Systems Assurance
- Systems Engineering
- Systems Design
- Transit Facilities Design
- Construction Management
- Rail Operations
- Rail Maintenance.
- Transit Police

Personnel from the following consultant organizations will provide information, assistance, and advice to the SRT, as required:

- General Consultant
- Construction Manager
- Systems Engineering and Analysis Consultant.
- Local Fire Departments
- Local Police Departments

2.0 CERTIFICATION PROCESS

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This chapter describes how the safety certification process will function. The discussion is keyed to Exhibit 2-1. The program will be accomplished in nine steps, as described in the following sections. As is evident in the exhibit, Metro Rail safety certification is a two-phased program, designed to verify that:

- The design criteria related to safety are properly incorporated into the appropriate contract specifications and directive drawings

- The safety requirements included in the contract specifications are properly designed into the final end products, that system-level safety tests are conducted, and that safety-related plans and procedures are developed, reviewed and approved prior to revenue service.

2.1 IDENTIFY THE CERTIFIABLE ELEMENTS OF THE METRO RAIL SYSTEM

The first step of the safety certification program is to identify those Metro Rail elements that need to be certified. A preliminary list of 71 certifiable elements of the Metro Rail system is shown in Exhibit 2-2. The elements are identified primarily by contract in the areas of systems and fixed facilities. Plans and procedures have been segregated into the functions of Safety and Training.

2.2 DEVELOP CRITERIA CONFORMANCE CHECKLISTS

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.

Exhibit 2-1

METRO RAIL
SAFETY CERTIFICATION PROCESS

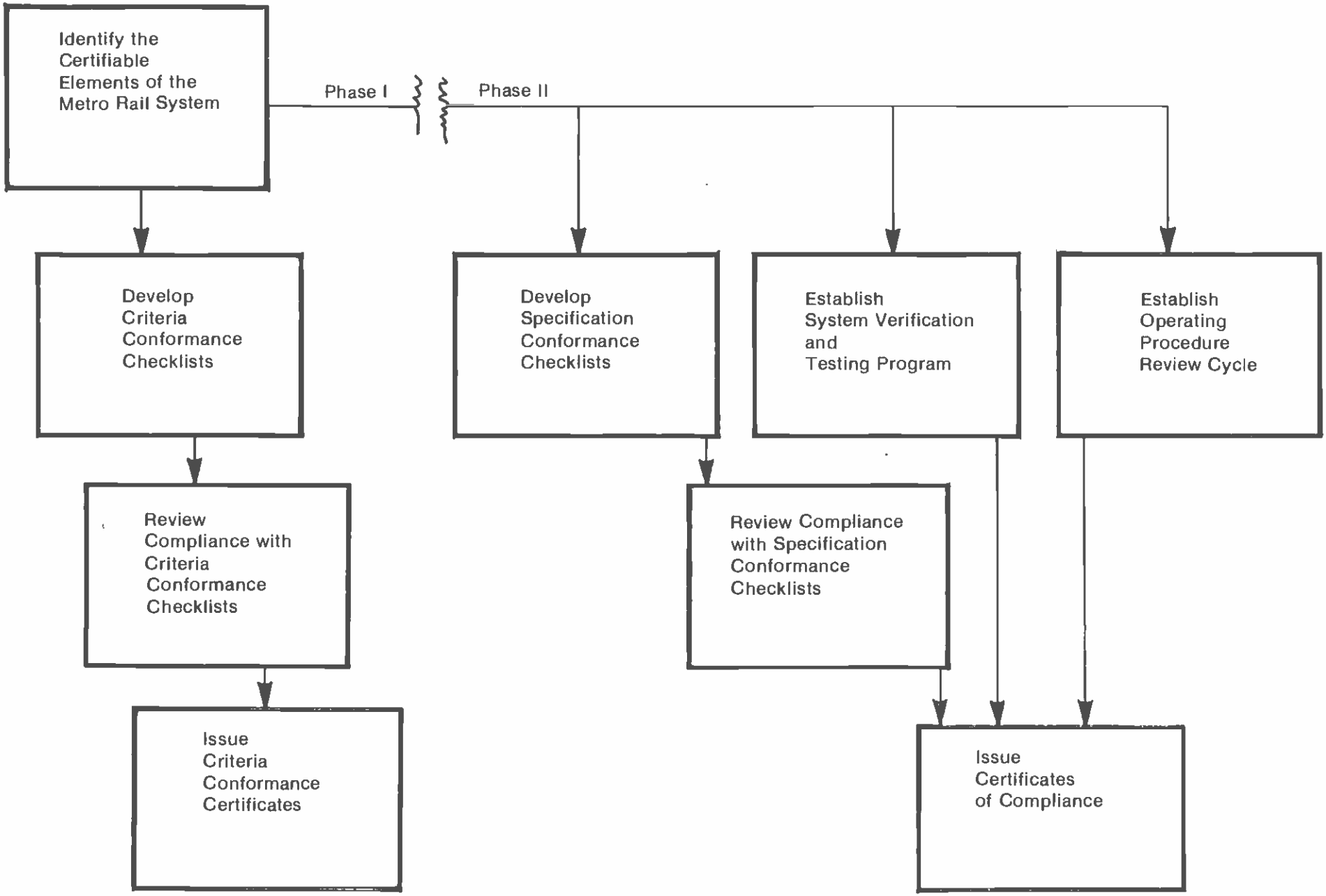

EXHIBIT 2-2
Preliminary List of Certifiable Elements

System Elements

1. Passenger Vehicles
2. Train Control
3. Communications
4. Supervisory, Control and Data Acquisition
5. Fare Collection
6. Traction Power
7. Fire Protection and Suppression Systems
8. Auxiliary Vehicles

Fixed Facilities

9. Emergency Response Equipment
10. Yard and Shop
11. Yard and Shop to Union Station Line
12. Union Station Station
13. Central Control Facility
14. Union Station to Civic Center Line
15. Civic Center Station
16. Civic Center to 5th and Hill Line
17. 5th and Hill Station
18. 5th and Hill to 7th and Flower Line
19. 7th and Flower Station
20. 7th and Flower to Wilshire/Alvarado Line
21. Wilshire/Alvarado Station
22. Wilshire/Alvarado to Wilshire/Vermont Line
23. Wilshire/Vermont Station
24. Wilshire/Vermont to Wilshire/Normandie Line
25. Wilshire/Normandie Station
26. Wilshire/Normandie to Wilshire/Western Line
27. Wilshire/Western Station
28. Wilshire/Western to Wilshire/Crenshaw Line
29. Wilshire/Crenshaw Station
30. Wilshire/Crenshaw to Wilshire/La Brea Line
31. Wilshire/La Brea Station
32. Wilshire/La Brea to Wilshire/Fairfax Line
33. Wilshire/Fairfax Station
34. Wilshire/Fairfax to Fairfax/Beverly Line
35. Fairfax/Beverly Station
36. Fairfax/Beverly to Fairfax/Santa Monica Line
37. Fairfax/Santa Monica Station
38. Fairfax/Santa Monica to La Brea/Sunset Line
39. La Brea/Sunset Station
40. La Brea/Sunset to Hollywood/Cahuenga Line
41. Hollywood/Cahuenga Station
42. Hollywood/Cahuenga to Hollywood Bowl Line
43. Hollywood Bowl Station
44. Hollywood Bowl to Universal City Line
45. Universal City Station
46. Universal City to North Hollywood Line
47. North Hollywood Station
48. North Hollywood Tail Track

Safety Related Plans and Procedures

49. Hazard Identification and Resolution Procedure
50. System Safety Program Plan--Operations
51. System Safety Organization
52. Emergency Preparedness Plan
53. Standard Operating Procedures
54. Emergency/Disaster Response Procedures
55. Security Operating Procedures
56. Operators Rulebook
57. System Verification and Testing Plan
58. Safety Features Test Plans and Procedures
59. Accident/Incident Investigation and Reporting Procedure
60. Fire Protection Features Manual
61. Fire and Police Communications Systems Handbook
62. Continuing Safety Certification and Audit Program

Training Programs

63. Vehicle Operators Training Program
64. CCF Personnel Training Program
65. Yard and Tower Personnel Training Program
66. Maintenance Personnel Training Program
67. Transit Police Training Program
68. Fire Department Training Program
69. Public Education Program
70. Other Outside Agency Training (DWP, LAPD, LACSD)
71. Emergency Team Training Exercises and Drills

During the Preliminary Engineering Phase, the Systems Engineering and Analysis Consultant (Booz, Allen & Hamilton) and the Subsystems Consultant (Kaiser Engineers) developed system-wide safety, security, and system assurance criteria*. During Continuing Preliminary Engineering and Final Design, the General Consultant (MRTC) is updating these criteria. All criteria sections have been developed after extensive peer reviews of industry experience, special studies on potential seismic events and the potential for the presence of gas, detailed reviews of city and county building and fire codes, NFPA requirements, special analyses of exit capacities and requirements under panic situations, CPUC general orders, and various industry guidelines and government regulations (IEEE, Cal/OSHA, NEC, etc.).

This has resulted in the most comprehensive baseline criteria documents relating to safety yet produced in the transit industry. The criteria documents themselves have undergone extensive review by all program participants and numerous outside agencies. Consequently, the criteria documents have been selected as an excellent initial baseline for the safety certification program.

Criteria Conformance Checklists will be developed by the SCRTD for each of the system and fixed facilities certifiable elements. The safety checklists will not be developed for plans and procedures. Each of the checklists will cover:

- Fire/Life Safety
- System Safety
- Security (related to safety)
- System Assurance (reliability, maintainability, quality).

Most station and tunnel segment checklists will be similar. The checklists will be developed based on the SCRTD Metro Rail System Design Criteria and Standards, Volume I, Sections 2, 3, 4, and 5, which cover fire/life safety, system safety, security, and system assurance, respectively. The General Consultant has been delegated responsibility for developing the Criteria Conformance Checklists. All checklists will be approved for completeness, accuracy and content by the SCRTD. A page from a Criteria Conformance Checklist is shown in Exhibit 2-3.

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* SCRTD Metro Rail System Design Criteria and Standards, Volume I, Sections 2, 3, 4, 5, November 1983.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

METRO RAIL PROJECT DESIGN REVIEW CHECKLIST

GROUP: _____ DATE: _____

REVIEWER: _____

DISCIPLINE: FIRE/LIFE SAFETY - PASSENGER VEHICLE

REVIEW REFERENCE: _____ CONTRACT NO.: _____

_____ REVIEW LEVEL: _____

REQ. I.D.	REQUIREMENT	YES	NO	COMMENT
2.4.2.1	Combustible Content Total combustible content of each transit vehicle shall not exceed a heating value of 60,000 BTU's. Each combustible material shall be specifically identified by supplier's name and type, shape and use in the vehicle, and total weight and heating value. Heating values shall be totalled for vehicle interior surface materials (including ducting, etc.), for other interior materials, for exterior materials not underfloor, and for all underfloor materials.			
2.4.2.2	Flammability of Vehicle Materials			
2.4.2.2.1	Upholstery and other fabric materials shall be tested by FAA Regulations 25.853 vertical test, Appendix F (b), with the following modifications: A. Average flame time after removal of the flame source may not exceed 10 seconds. B. Burn length shall not exceed 6 inches. C. Flame dripping shall not be allowed.			

2.3 REVIEW COMPLIANCE WITH CRITERIA CONFORMANCE CHECKLISTS

During the final design review process, the SCRTD will use the checklists to verify that all appropriate design requirements, as identified in the criteria, have been incorporated into the appropriate contract specifications and directive drawings.

Assuring that the contract specifications and associated drawings conform to the design criteria is the responsibility of the General Consultant and the Transit Facilities Design and Systems Design and Analysis departments of Metro Rail. The SRT will have the responsibility to review evidence that the specifications conform with the design criteria. The General Consultant will present the SRT with evidence (completed checklists and statements from the Fire/Life Safety Committee, Security Subcommittee, and other Systems Design and Transit Facilities personnel) that demonstrate proper incorporation of the fire/life safety, system safety, security and system assurance criteria into the appropriate contract specifications. Any discrepancies between the criteria and specifications relating to safety must be approved in writing by the SCRTD.

2.4 ISSUE CRITERIA CONFORMANCE CERTIFICATES

When the SRT determines that all safety criteria are properly contained in the contract specifications for a certifiable element, the SRT will recommend that the element receive a "Criteria Conformance Certificate". The certificate attests to the fact that the specifications reflect and conform with the safety requirements contained in the System Design Criteria. If the SRT believes that specification language or drawings do not comply with the intent of the design criteria, it has the responsibility of withholding its recommendation that the element receive a Criteria Conformance Certificate. A Criteria Conformance Certificate is shown in Exhibit 2-4.

RTD

CRITERIA CONFORMANCE CERTIFICATE

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

Safety Certification Program

Completion of this Certificate indicates that the specifications and drawings of the Certifiable Element indicated below comply with all applicable SCRTD safety, fire/life safety, security, and system assurance criteria.

CERTIFIABLE ELEMENT _____

CONTRACT SPECIFICATION(S) INCLUDED:

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.

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EXCEPTIONS NOTED:

Chairman, Safety Review Team	Date	Director, Systems Design and Analysis or Transit Facilities Design	Date

Southern California Rapid Transit District 425 South Main Street, Los Angeles, California 90013 (213) 972-6000

2.5 DEVELOP SPECIFICATION CONFORMANCE CHECKLISTS

To assure a logical and orderly flow of information for final certification, the SCRTD will prepare specification conformance checklists. The checklists will identify each of the safety requirements included in each specification. During supplier design reviews, quality and safety audits, inspections, and tests, the SCRTD will use the checklists as a tool to identify, collect, and document the approval of evidence that demonstrates safety requirements have been achieved.

A suggested format for the Specification Conformance Checklist is shown in Exhibit 2-5. The General Consultant has been delegated responsibility for developing the specification conformance checklists. The checklists will be updated as required when subsequent approved engineering changes affect safety. All checklists will be approved for completeness, accuracy and content by the SCRTD.

2.6 REVIEW COMPLIANCE WITH THE SPECIFICATION CONFORMANCE CHECKLISTS

Each safety requirement on the Specification Conformance Checklist will require evidence that demonstrates its achievement. Some of the evidence will be presented to the SCRTD during design reviews, audits, and inspections of the equipment or facilities. Some of the requirements such as hazard analyses, test plans, and manuals may be contract data requirements list (CDRL) deliverables. Other safety requirements do not require a formal submittal, but need to be verified to assure a safe system. Compliance with these requirements will need to be verified and properly documented by SCRTD and Construction Manager personnel during design reviews, audits, inspections, and tests. Collecting the written evidence for compliance with these requirements will rest with SCRTD and Construction Manager personnel. Any discrepancies between end products and the specifications that relate to safety must be approved in writing by the SCRTD.

2.7 ESTABLISH SYSTEM VERIFICATION AND TESTING PROGRAM

Of particular importance in the process of safety certification is the determination that the various elements of Metro Rail (facilities, equipment, and procedures) can function together as a system. Consequently, an important aspect of certification is safety related system-level testing to:

- Verify the compatibility of equipment, facilities, software, and operating procedures to function together under normal, adverse, and emergency situations

EXHIBIT 2-5
Southern California Rapid Transit District
Metro Rail Project
Safety Certification Program
Specification Conformance Checklist

Certifiable Element: Vehicle
Subsystem: Operator Cab

Safety Requirement	Specification Reference	Evidence			
		Responsibility	Timing	Document #	Approved
• The operator cab shall utilize the full width of the car when in use	9.1.a	Safety Supervisor	PDR, Mock-Up		
• Operator cab doors shall be lockable from inside and outside and the right side window shall be lockable from the inside only	9.1.b	Safety Supervisor	CDR, Mock-Up		
• The cab layout shall provide adequate visibility for the operator to the station platform and car interior for control of the train and safety of passengers	9.4	Safety Supervisor	PDR, CDR, Mock-Up		
• The operator cab shall include as a minimum the following:		Safety Supervisor	CDR, Mock-Up		
- Fire Extinguisher	9.5.1.e				
- Parking Brake Control	9.5.1.f				
- Communications Control Unit	9.5.1.1				
- Manual controller with "deadman" feature	9.5.1.o				
• The surface area of the console shall be non-reflective	9.6.1	Safety Supervisor	CDR		
• The reading light shall be designed and aimed so as to cause minimum interference with observation of the roadbed when in use at night.	9.6.2	Safety Supervisor	CDR		

- Verify the coordination and response capabilities of the SCRTD and outside agencies

- Identify equipment, facilities, software, and operating procedures that must be modified to achieve safety or operational requirements.

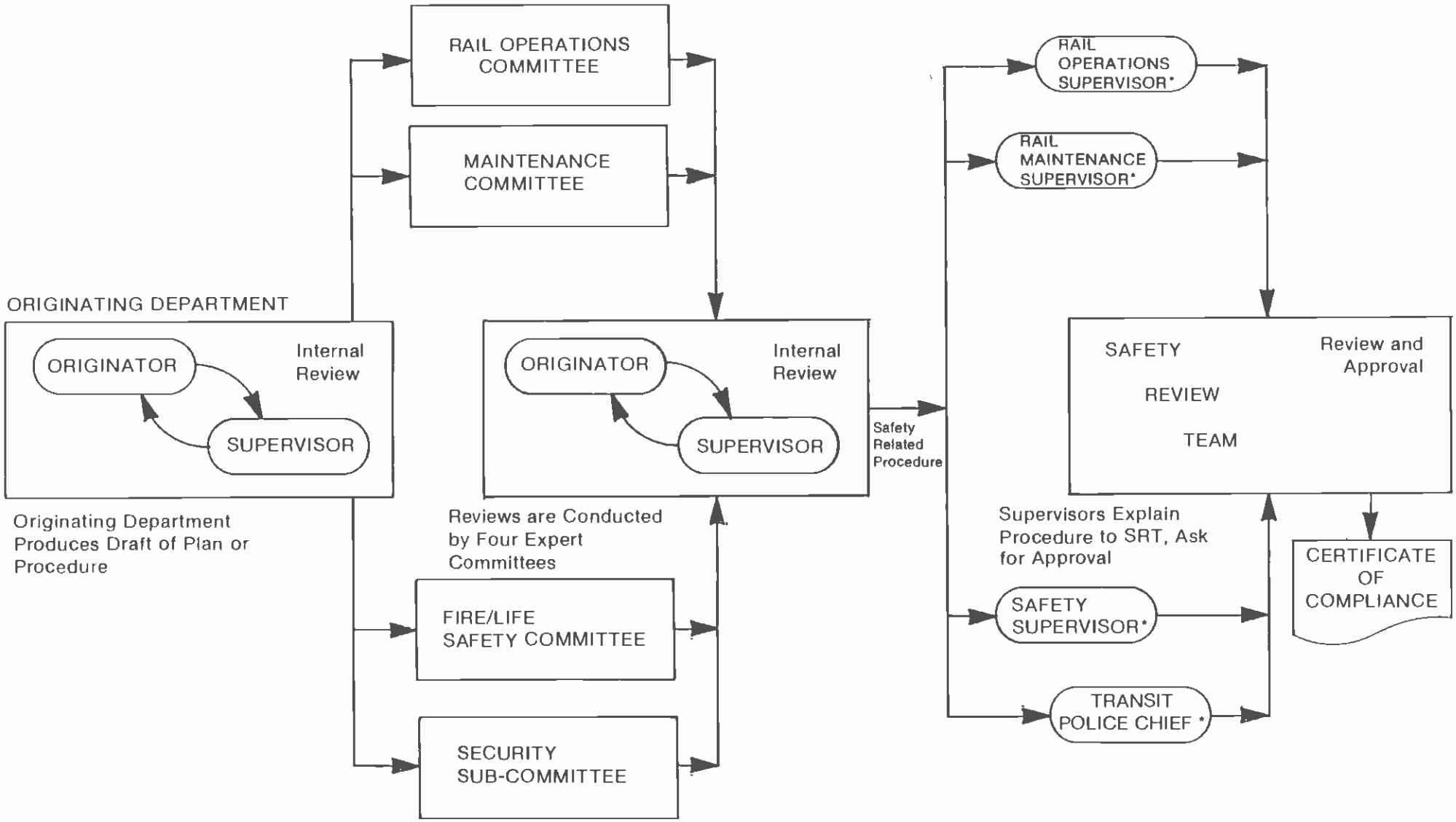
To assure that the management and technical resources required to meet these objectives are applied in a coherent and organized manner, a System Verification and Testing Plan (SVTP) will be developed. As such, one certifiable element (#57) is the SVTP. The SVTP, prepared during the construction/acquisition phase of the Metro Rail, will be a broad-based program which covers all testing activities from delivery until the beginning of revenue service. The SVTP will cover both functional and safety testing. Those tests which relate to safety will be identified in the SVTP and will become certification requirements. In specific situations, the SVTP may be applied to tests conducted at the Pueblo Test Center or at the contractor's facilities.

2.8 ESTABLISH OPERATING PROCEDURE REVIEW CYCLE

The contract specifications will provide the baseline for the safety requirements in systems and fixed facilities. The System Verification and Testing Plan will identify the safety tests that need to be conducted prior to revenue service. The SCRTD's System Safety and Security Program Plan identifies the plans, procedures, and activities the SCRTD must develop or perform prior to revenue service, but there are no identified requirements for the specific content of the plans or procedures. The most effective method for assuring that proper content is included is to have a widespread review and comment cycle involving engineering, safety, operations, and maintenance personnel. A formal "Operating Procedures Review Cycle" will be established by the SCRTD to review procedures, manuals, and other documents as they become available in the year or two prior to revenue service. The reviews will usually include input and discussions with OCC supervisors, emergency response personnel (fire and police), maintenance personnel, management, safety staff, and design engineers. Special emphasis will be placed on assuring that those people who will operate, maintain, and police the Metro Rail have a thorough interaction with the engineers who designed the system. Once a safety related plan or procedure has completed the cycle, and conflicts are resolved, the plan or procedure can be certified. A possible operating review cycle is illustrated in Exhibit 2-6.

Exhibit 2-6

METRO RAIL
OPERATING PROCEDURE REVIEW CYCLE



Particular emphasis will be placed on the development of an Emergency Preparedness Plan (EPP) (Certifiable Element #52) and the Emergency/Disaster Response Procedures (Certifiable Element #54) contained in the EPP. The EPP will be the focus of all agreements and procedures which coordinate SCRTD response to emergencies with the response of outside agencies.

2.9 ISSUE CERTIFICATES OF COMPLIANCE

The Construction Manager will provide evidence to the SRT that safety requirements in the contract specifications have been achieved. The SRT is responsible for reviewing the evidence and recommending to Metro Rail management that a certifiable element is safe for public use and should receive a Certificate of Compliance. A possible format for the Certificate of Compliance is shown in Exhibit 2-7.

The System Verification and Testing Director (exact title to be determined) will provide evidence to the SRT that all safety-related testing in the SVTP has been accomplished.

In the case of safety related operating procedures or training programs, after each operating procedure or training course has completed the review cycle, the appropriate SCRTD manager (Rail Operations, Rail Maintenance, Safety Supervisor, or Transit Police) will explain the procedure to the SRT, present evidence of proper review, and ask for the SRT to recommend approval for certification.

In the year prior to revenue service, the SCRTD will prepare and distribute periodic reports to interested parties (CPUC, Fire Departments, Police Departments) describing the progress of certification.

RTD

CERTIFICATE OF COMPLIANCE

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

Safety Certification Program

Completion of this Certificate indicates that the Certifiable Element indicated below complies with all applicable specification safety requirements and is judged safe for public use/revenue service.

CERTIFIABLE ELEMENT _____

DATE OF CERTIFICATION _____

RESTRICTIONS:

APPROVALS:

Chairman, Safety Review Team	Date	Director, Construction Management	Date
Director, Systems Design and Analysis	Date	Assistant General Manager, TSD	Date

Southern California Rapid Transit District 425 South Main Street, Los Angeles, California 90013 (213) 972-6000

3.0 CERTIFICATION PROGRAM DEVELOPMENT

3.0 CERTIFICATION PROGRAM DEVELOPMENT

The process of safety certification program development and the responsibilities for each task are summarized in this chapter. In addition, a chart is provided showing the approximate time frame when each task will be undertaken.

The safety certification program work effort is as follows:

Task	Responsibility*
I. Complete Safety Certification Methodology	
A. Review and Comment on Draft	SDA, TFD, CM, MRTC, PDCD
B. Finalize Safety Certification Methodology	BAH
C. Approve Safety Certification Methodology	SDA
D. Brief Senior RTD Management	SDA
E. Explain Safety Certification Methodology to CPUC	SDA,
II. Finalize Criteria Conformance Checklists	
A. Prepare Final Update of System-wide Criteria (Sections 2, 3, 4, 5)	MRTC
B. Review and Comment on Final Criteria (Sections 2, 3, 4, 5)	SDA, TFD, CM, PDCD, BAH

* The following abbreviations are used:

SDA--Systems Design and Analysis
TFD--Transit Facilities Design
CM--Construction Management
MRTC--Metro Rail Transit Consultants
PDCD--Parsons, Dillingham Construction, DeLeuw & Cather
RM--Rail Maintenance
RO--Rail Operations
BAH--Booz, Allen & Hamilton
SRT--Safety Review Team

	C. Develop Draft Criteria Conformance Checklists	MRTC
	D. Review and Comment on Criteria Conformance Checklists	SDA, TFD, CM, PDCD, BAH
	E. Finalize System-wide Criteria (Sections 2, 3, 4)	MRTC
	F. Finalize Criteria Conformance Checklists	MRTC
	G. Approve System-wide Criteria (Sections 2, 3, 4)	SDA
	H. Approve Criteria Conformance Checklists	SDA
III.	Develop Safety Certification Plan	
	A. Appoint Safety Review Team (SRT)	SDA
	B. Develop Draft of Safety Certification Plan	BAH
	C. Review and Comment on Safety Certification Plan	SDA, TFD, CM, MRTC, PDCD
	D. Finalize Safety Certification Plan	BAH
	E. Approve Safety Certification Plan	SDA
	F. Brief Senior RTD Management	SDA
	G. Explain Safety Certification Plan to CPUC	SDA
IV.	Review Compliance with Criteria Conformance Checklists	
	A. Establish SRT Review Schedule	SDA
	B. Chair SRT Meetings	SDA
	C. Present Evidence to the SRT	MRTC, SDA, TFD
	D. Review and Approve Evidence	SRT
	E. Issue Safety Criteria Conformance Certificates	SDA
V.	Develop Specification Conformance Checklists	
	A. Develop Draft Specification Conformance Checklists	MRTC
	B. Review and Comment on Specification Conformance Checklists	SDA, TFD, CM, PDCD, BAH
	C. Finalize Specification Conformance Checklists	MRTC

	D. Update as Required for Engineering Changes	MRTC
	E. Approve Specification Compliance Checklists	SDA
VI.	Develop Safety Certification Procedures	
	A. Develop Draft Procedures and Documentation Requirements	BAH
	B. Review and Comment on Safety Certification Procedures	SDA, TFD, CM, MRTC, PDCD
	C. Finalize Safety Certification Procedures	BAH
	D. Approve Safety Certification Procedures	SDA
	E. Brief Senior RTD Management	SDA
	F. Explain Procedures to CPUC	SDA,
VII.	Establish System Verification and Testing Program	
	A. Develop Draft System Verification and Testing Plan (SVTP)	SDA
	B. Review and Comment on SVTP	TFD, CM, RO, RM, MRTC, PDCD, BAH,
	C. Finalize SVTP	SDA
	D. Approve SVTP	SDA
VIII.	Establish Operating Procedure Review Cycle	
	A. Develop Draft Operating Procedure Review Cycle (OPRC)	BAH
	B. Review and Comment on OPRC	SDA, TFD, CM, RO, RM, MRTC, PDCD
	C. Finalize OPRC	BAH
	D. Approve OPRC	RO, RM
IX.	Review Compliance with Specification Conformance Checklists	
	A. Establish SRT Review Schedule	SDA, TFD, CM
	B. Gather Evidence at Design Reviews, Audits, Inspections, and Tests	PDCD, CM

C. Chair SRT Meetings	SDA
D. Present Evidence to SRT	PDCD, CM
E. Recommend Approval of Certificate of Compliance	SRT
F. Approve Certificates of Compliance	Project Manager
G. Prepare Periodic Certification Status Reports	SDA
H. Approve Metro Rail to Begin Service	General Manager

EXHIBIT 3-1
Safety Certification Tasks and Timing