16.0 Hazard/Risk Severity and Probability Analysis

Hazard Risk Assessment Process

This Hazard Risk Assessment Process is modeled after the Military Standard 882. The Hazard Risk Assessment Procedure may be used when daily standard operations cannot bring about hazard resolution, or when a hazard/risk assessment warrants escalating to the CSC. The procedure will also be used for designated projects or as required in the SSCP. Conditions will also need to be assessed and anticipated as the result of proposed changes in future operations when no risk control criteria exist.

Hazard and Risk assessment related to construction preparations and methods on safety critical elements, items, and procedures must be developed for each designated new individual major capital project or encroachment project if no present criteria exist (refer to the SSCP Plan).

Finally, the Hazard Risk Assessment Process provides safety information and records for later review to evaluate Caltrain's safety performance.

Hazard Risk Severity and Probability Analysis

Integral to the Hazard Analysis process is identification and analysis of hazards involving the respective work environment to facilitate proposed mitigation as a result of comparable items based upon a standardized process. As is determined to be necessary, this process and the respective results may be reviewed by each stakeholder to ensure that key perspectives are included in the efforts to determine the effective mitigation of hazards. When needed, more detailed supplemental studies will be conducted to support analysis of an option or hazard. A corrective action for individual mitigations will be generated in the hazard management application to ensure that any included hazard leads to effective closure.

Following are the three stages for hazard analysis/assessment.

Stage One, Hazard Categorization and Assessment

It is extremely important to analyze the "most typical" outcome from a hazard. While worse case scenarios may have different indications of risk levels, they are not always useful in the Hazard Assessment process as worse case scenarios may always produce an unacceptable risk level for even the most minor hazard and do not indicate the typical outcome resulting from a hazard.

- PCJPB employs a standard method based on MIL STD 882 to analyze identified hazards and, based on the results of this analysis, determine the need for associated mitigation. The hazard management process supports documentation of the hazard analysis process, corrective actions tracking to include target dates to complete corrective actions.
- Each hazard will be categorized to conform to the standard method. For the probability of occurrence, the following categories are employed; Frequent, Probable, Occasional, Remote,

and Improbable. For severity of event consequences, the analysis uses; Catastrophic, Critical, Marginal, and Negligible.

- Each aspect will be represented in a matrix to determine the required disposition. It should be noted that PCJPB has refined the matrices in accordance with the railway environment in order to provide improved grading of the hazards common to the railway.

Refer to Figure 17-a through Figure 17-d on the following pages.

Hazard Severity Categories

Description	Category	Definition
CATASTROPHIC	I	Death, system loss, severe environmental damage, or complete and extended disruption of service
CRITICAL	II	Severe injury, severe occupational illness, major system or environmental damage, or major disruption of service
MARGINAL	III	Minor injury, minor occupational illness, minor system or environmental damage, or minor disruption of service
NEGLIGIBLE	IV	Less than minor injury, occupational illness, less than minor system or environmental damage, or less than minor disruption of service

Figure 17-a: Hazard Severity Categories

Disruption of Service as referenced within the Hazard Management Process refers to a disruption as a result of reported damage to equipment, facilities, and/or other property as a result of a collision, derailment, or any event that is not addressed through routine Operations practices or procedure.

Hazard Probability Levels

Description	Level	Specific Item	Fleet/Inventory
FREQUENT	A	Likely to occur frequently	Continuously experienced
PROBABLE	B	Will occur several times in the life of an item	Will occur frequently
OCCASIONAL	C	Likely to occur sometime in the life of an item	Will occur several times
REMOTE	D	Unlikely but possible to occur in the life of an item	Unlikely but can reasonably be expected to occur
IMPROBABLE	E	So unlikely, it can be assumed occurrence may not be experienced	Unlikely to occur, but possible

Figure 17-b: Hazard Probability Levels

Hazard Risk Index

Frequency of occurrence	1	2	3	4
	Catastrophic	Critical	Marginal	Negligible
(A) Frequent	IA	IIA	IIIA	IVA
(B) Probable	IB	IIB	IIIB	IVB
(C) Occasional	IC	IIC	IIIC	IVC
(D) Remote	ID	IID	IIID	IVD
(E) Improbable	IE	IIE	IIIE	IVE

Figure 17-c: Hazard Risk Index

Hazard Rating Table

Risk Category	Hazard Risk Index	Determination Criteria
1	IA, IB, IC, IIA, IIB, IIIA	Unacceptable—must be eliminated or mitigated The Caltrain GM, in consultation with the Caltrain DGM & TASI-GM, is responsible for approval of all mitigations and service-related decisions
2	ID, IIC, IID, IIIB, IIIC	Undesirable—Management Action Required The DGM Caltrain, in consultation with the Caltrain Director Safety, the TASI DGM-Safety is responsible for mitigation decisions.
3	IE, IIE, IIID, IIIE, IVA, IVB	Acceptable with review—Management Action Required The Caltrain DGM, in consultation with the Caltrain Safety Director and TASI's DGM-Safety review and approve all mitigations actions
4	IVC, IVD, IVE	Acceptable without review The hazard management team will always present their findings and recommendations to the Caltrain DGM & Director Safety and the DGM-Safety for TASI.

Figure 17-d: Hazard Rating Table

The Determination Criteria indicates four groupings of Hazard Risk analysis as depicted within the