Project 1
Evaluation Rubric

Section or Criteria	Weight	Unsatisfactory	Below Satisfactory	Satisfactory
Summary	5%	Recommendation(s) not supported by evidence and do not include a statement of statistical confidence.	Recommendation(s) are not actionable and are not supported by statistical confidence.	Actionable recommendation(s) supported by evidence and a statement of statistical confidence.
Situation	22%	Work does not demonstrate an understanding of the current safety situation of rail accidents supported by textual description and univariate and multivariate visualizations.	Work only partially provides a picture of the safety situation of rail accidents. Fails to apply the techniques from class to develop discussion and supporting visualizations to provide a path to meaningful hypotheses. Provide incomplete discussion of qualitative and/or quantitative variables.	Provides a detailed summary of the current safety situation of rail accidents, which is one of few severe accidents including univariate and multivariate analysis of qualitative and quantitative variables necessary to describe the severe accidents, choose predictors, and form meaningful hypotheses.
Goal	2%	Goal incorrect / inappropriate for the project assignment.		Goal tied to project assignment, mentions the FRA, and the end goal of what will be provided to the FRA based on analysis.
Metrics	4%	No metrics selected or incorrect metrics selected for project goal.	Too few metrics selected and metric selection not motivated.	Correct number of metrics selected and metric selection clearly motivated by techniques covered in class.
Hypotheses	4%	Hypotheses not testable and rejectable or resulting from situational analysis.	1 or more hypotheses not tied to controllable, actionable factors from the situational analysis.	Hypotheses motivated by controllable factors from situational analysis. When tested and rejected / accepted hypotheses will allow for an actionable recommendation.
Data	7%	Did not properly document data, include citations of data source, or explain observations and actions regarding missing data and bias.	Properly documented data and sources but did not discuss one of the following: • Indicated any missing data or biases • Explained actions to correct for missing data or bias	Properly documented the data used for this analysis including: • Cited sources of the data used in this study • Indicated any missing data or biases • Explained actions to correct for missing data or bias

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Analysis	20%	Neglected to follow proper analysis procedure. No explanation provided for selected models, feature selection, etc.	Provided incomplete analysis and did not discuss one or more of the following: • Analysis and modeling approaches • Feature and model selection techniques used • Treatment of ordinal and categorical variables	Described the analysis techniques and modeling approaches they applied to the problem including: • Linear models used to provide evidence • Feature and model selection techniques used to find appropriate models for this problem • Treatment of ordinal and categorical variables (i.e., how were they coded)
Evidence	20%	Neglected to provide evidence to answer question posed in Section 1.2: • Did not assess statistical models • Make adjustments based on diagnostics • Consider transformations • Discuss statistical confidence in results or tie results back to goal and hypotheses	Provided incomplete consideration and discussion of evidence and did not perform one or more of the following: • Model diagnostics • Model assessment • Model adjustments • Answer the questions posed by the goal • Formally describe confidence in results relative to selected hypotheses	Provided sufficient evidence to answer question posed in Section 1.2 including: • Used at least two techniques to assess models, provided at least one set of diagnostic plots and explanation of transformation using the Box-Cox plot • Described results from the application of the methods in the Analysis Section to the data to produced evidence for the hypotheses • Answered the questions posed by the goal • Formally described confidence in the results by explaining model assessment, problem diagnosis, and adjustment

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Recommendation	6%	Recommendation(s) not supported by evidence and no statement of formal statistical measures of confidence.	Recommendation(s) not supported by evidence and / or no discussion of statistical measures of confidence.	Recommendations supported by evidence and include: • Stated findings and recommendations for safety improvements based on the evidence • Recommendations are backed up with formal measures of confidence (i.e., confidence intervals), model validity (e.g., adjusted-R^2) and possible inclusion of visual displays or reference to tables and figures in other sections
References	3%	No cited references in report		At a minimum, cited assignment, template, and source of the data as well as any other sources of information used.
Style and Presentation	8%	Does not follow template or guidelines for project		Followed template and style guidelines: • Properly followed project template • Numbered figures, tables, and page numbers • PDF for final version of assignment
Optional Appendix	-	Optional appendix can be used for: • Variable descriptions • Data summaries • Source code • Anything else deemed necessary for the report		
Other Deductions	-	• **1 point** will be deducted for improper mathematical notation. Models should be written in the following format: $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_n x_n + \epsilon$ • **1 point** will be deducted each time there is pasted R source code in the body of the report (the only place this is appropriate is in the Appendix). • **0.5 to 1 point** deductions will be made for poor grammar and usage, spelling, and punctuation. Formal technical language should be utilized, not conversational text. Superfluous text will also be penalized.		