

Northern California Railroad Analysis

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Introduction

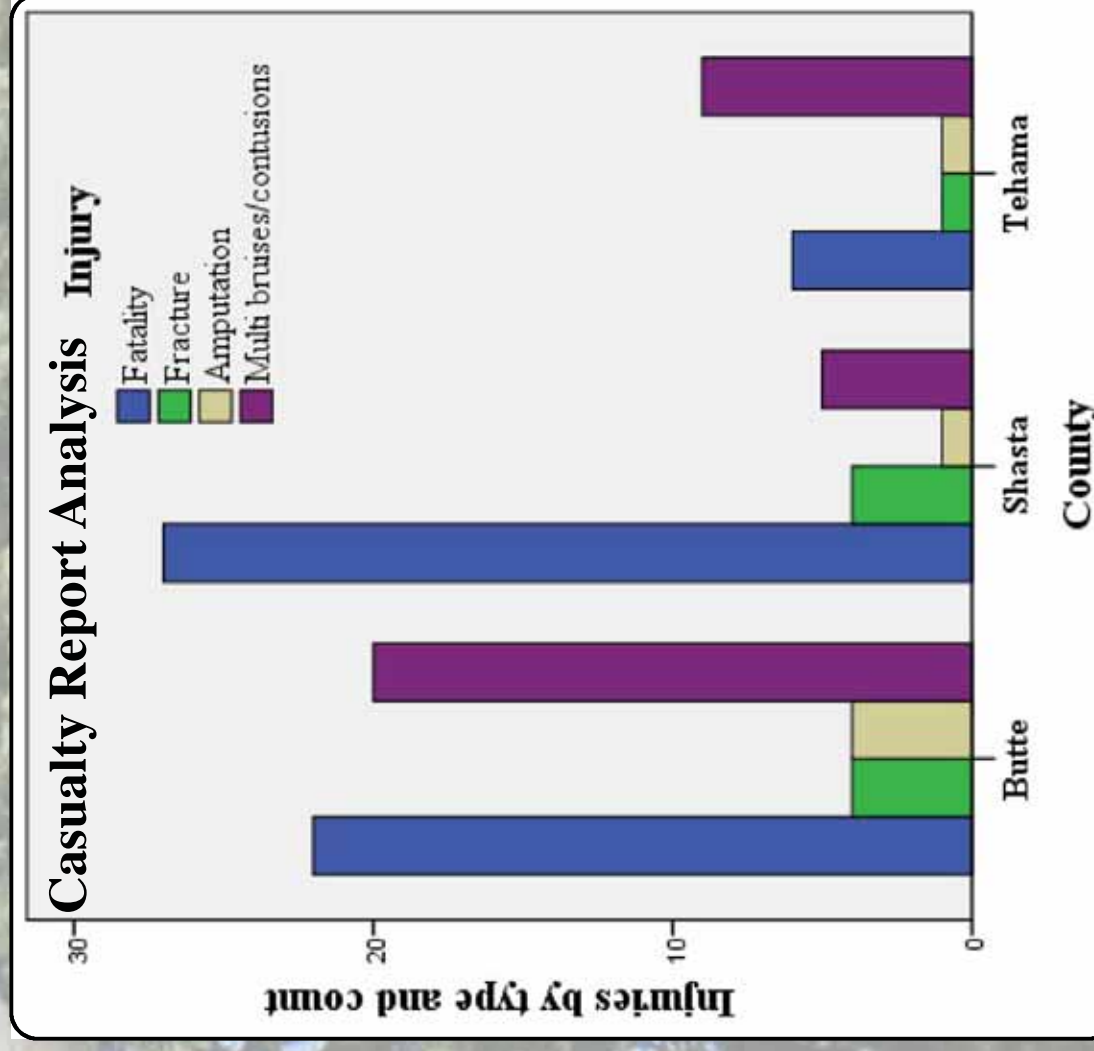
The purpose of this project is to analyze the railway that runs through Chico and Redding. This paper will reflect the results of the GIS analysis for handling a backup of trains in the event of an emergency. This could include anything from getting two long trains past each other at a double track section to rerouting trains.

Available Routes

- Denotes area of double track analysis
- Route of study miles 272.1
- Eastern alternate route around Chico and Redding miles 298.4
- Western alternate route around Chico miles 115.9

Data

- GIS shape file from Center for Transportation Analysis website <http://www.cta.ornl.gov/transnet/RailRoads.html>
 - Google maps lat, long data; put into a comma delimited notepad file
 - ArcMap, notepad file displayed as x,y data and exported as a shape file
 - Network database was developed to analyze track data for route length
- ## Methods
- ArcMap Track System Network analysis routes were mapped.
 - Field calculated routes for mileage.
 - Displayed as the Main, East and Western routes.
 - Double track areas were digitized in using point data collected from Google maps
 - Measurements were taken using the measure tool.
 - A table on train length vs double tracks length was developed.
 - Accident reports calculated into SPSS to generate injury chart divided by county.



Double Track Analysis

Double track sections 1 - 17 as numbered on map

| Track Section | Section Length | # Trains |
|---------------|----------------|----------|
| 1 | 1.26 miles | 1 |
| 2 | 1.90 miles | 1-2 |
| 3 | .97 miles | 1 |
| 4 | 1.01 miles | 1 |
| 5 | 2.06 miles | 2 |
| 6 | .37 miles | 0 |
| 7 | 1.01 miles | 1 |
| 8 | 1.79 miles | 1 |
| 9 | 1.20 miles | 1 |
| 10 | 1.63 miles | 1 |
| 11 | 1.60 miles | 1 |
| 12 | 1.62 miles | 1 |
| 13 | .53 miles | 0 |
| 14 | 1.62 miles | 1 |
| 15 | 3.00 miles | 2-3 |
| 16 | 1.64 miles | 1 |
| 17 | 1.62 miles | 1 |

Average train length 1-1.5 miles; approximately 82 cars and two engines.

Results

- There are 13 double track sections that can accommodate a train while waiting to pass an oncoming train.
- There is one section of track where there are three tracks in which a third train can also wait aside a waiting train to allow an oncoming train to pass.
- There are three sections that can accommodate two trains or one extra long train waiting to allow an oncoming train to pass.
- There is one section that can accommodate three trains or an extra long train waiting to allow an oncoming train to pass.
- There is one shorter alternate route that will get trains past the Chico area.
- There is one eastern alternate route that will get trains past both the Chico and Redding areas.

Conclusion

There are various multi track sections that can be used to store damaged train cars without compromising open tracks for train to pass. With today's advanced communication system trains have plenty of warning to stop at a double track area if needed, although a train traveling at 70mph needs at least 1 mile to come to a complete stop. Most train accidents are the result of human trespassers onto railroad property. For a more precise analysis of a correlation between population and train involved accidents exact location data would have to be obtained.

References

- Federal Railroad Administration (<http://www.fra.dot.gov/Page/P0001>)
Accident and casualty data, Safety reports, train frequency on railroad of study.
- Center for Transportation Analysis (<http://www.cta.ornl.gov/transnet/RailRoads.html>)
GIS data

