Sterling Highway MP 45-60 Accident Analysis

Prepared for:

State of Alaska
Department of Transportation and
Public Facilities

Prepared by:
HDR Alaska, Inc.
2525 C Street, Suite 305
Anchorage, Alaska 99503

March 2006

TABLE OF CONTENTS

1.0 Introduction

The Sterling Highway Mile Post (MP) 45 to MP 60 is the only section of the Sterling Highway not substantially upgraded since its original construction in the 1930s. In 2000, the Alaska Department of Transportation (ADOT) finished a construction project to upgrade the highway to current standards from MP 37, where the highway splits from the Seward Highway, to MP 45 at Quartz Creek Road. While safety is a primary concern with any roadway improvement; accident statistics are one indicator of a roadway's need for improvement.

Accident analyses typically use a ten-year rolling average of traffic volumes and accidents to produce accident reports. Complete data sets for the Sterling Highway are available from ADOT for 1995–2004 (Appendix 1). This data should be sufficient to delineate important trends in accidents along the corridor. The ten years of data, illustrated below in Table 1, show that there have been a total of 299 accidents along the corridor. This averages to nearly 30 accidents per year for the last ten complete years of data. Of these accidents 7 were fatalities, and 19 were major injuries. The remaining were minor injuries or property damage only accidents.

Table 1
Sterling Highway: Quartz Creek Rd. to Skilak Lake Rd.

Year	Segment Length	Fatalities	Major Injuries	Minor Injuries	Property Damage	Total Accidents	ADT	Accident Rate
1995	13.7	0	3	3	10	16	2972	1.077
1996	13.7	1	1	3	16	21	2465	1.704
1997	13.7	1	0	7	10	18	2538	1.418
1998	13.7	1	1	9	14	25	2851	1.754
1999	13.7	1	1	8	21	31	2998	2.068
2000	13.7	0	2	7	26	35	2803	2.497
2001	13.7	0	5	14	33	52	2921	3.560
2002	13.7	1	0	7	14	22	3134	1.404
2003	13.7	1	4	12	20	37	3115	2.375
2004	13.7	1	2	9	30	42	3157	2.660
TOTAL:	13.7	7	19	79	194	299	28954	2.065
AVERAGE:	13.7	**0.7**	**1.9**	**7.9**	**19.4**	**29.9**	**2895.4**	**2.065**

1.1 Accident Rate

The accident rate of a roadway is determined by calculating how many accidents can be expected per million vehicles per mile within the corridor. To make this calculation, we need to know the average daily traffic (ADT), segment length of the highway being assessed, and how many accidents there has been each year over the timeframe of the analysis. Using the formula:

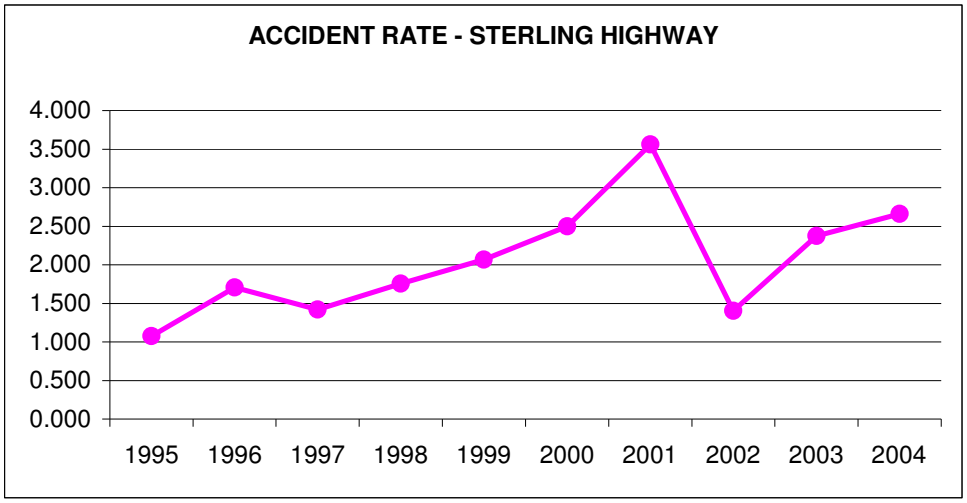
(Number of accidents*1,000,000)/(365*ADT*Segment Length)

This yields an accident rate of 2.065 accidents per million vehicles per mile.

The accident rate along the Sterling Highway from Quartz Creek Road to Skilak Lake Road nearly doubled between 1995–2004 or at an annual rate of 14.7 percent. In 2001, the accident

rate peaked to a data record high of 52 accidents and dropped considerably to 22 accidents and has increased steadily since 2002 (Figure 1).

Figure 1



Knowing the accident rate is important but more important is interpreting the rate, (e.g. knowing whether a 2.065 accident rate is high, low, or somewhere in-between). To know this, many states have an index of accident rates they develop for different types of highways. The State of Alaska is in the process of developing the most current 2004 data, but it is not currently available.

The Sterling Highway is an undivided rural principal arterial highway part of the National Highway System (NHS). According to ADOT's 2003 Statewide Average Accident Rates, such road category has a computed accident rate of 1.554. Therefore, the section of the Sterling Highway located within the study area comprises of more accidents than the average highway of the same road category. The above accident rate of 2.065 has the characteristics of an urban principal arterial thoroughfare.

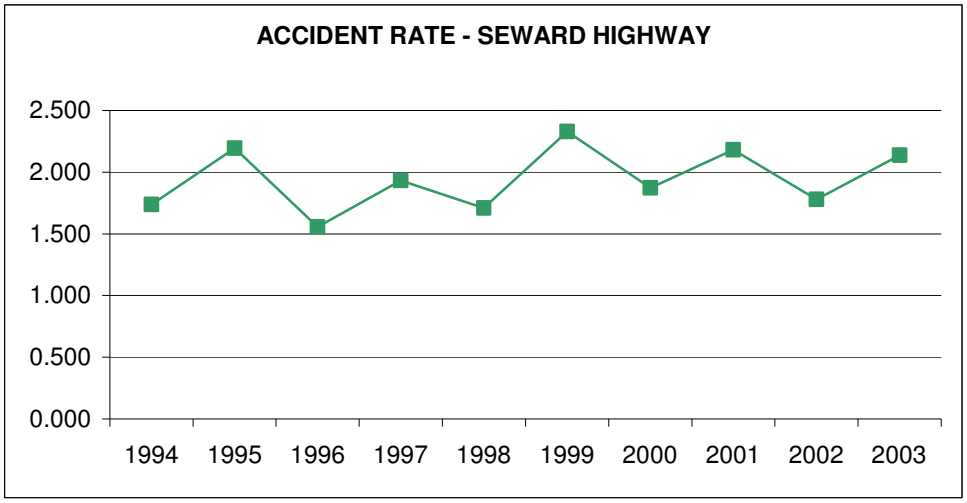
Within a different ten year period (1994–2003), the Seward Highway MP 73–90 has a slightly lower accident rate than the study area, 1.947 compared to 2.065 (Table 2). The highway segment in the study area averages approximately 15 accidents more a year than the Seward Highway and retains a lower ADT count. However, the assessed segment of the Sterling Highway is 3.3 miles shorter in length than the assessed segment of the Seward Highway.

Table 2
Seward Highway MP 73 to 90 (1994-2003)

Year	Segment Length	Fatalities	Major Injuries	Minor Injuries	Property Damage	Total Accidents	ADT	Accident Rate
1994	17	2	2	5	10	36	3,337	1.739
1995	17	1	4	12	13	47	3,452	2.194
1996	17	5	1	4	6	33	3,416	1.557
1997	17	6	2	10	7	42	3,505	1.931
1998	17	1	1	8	13	40	3,772	1.709
1999	17	7	2	13	15	54	3,737	2.329
2000	17	3	0	8	14	42	3,614	1.873
2001	17	6	0	7	22	52	3,844	2.180
2002	17	1	3	14	13	48	4,350	1.778
2003	17	5	3	8	24	57	4,300	2.136
TOTAL:	17	37	18	89	137	451	37,327	1.947
AVERAGE:	**17**	**3.7**	**1.8**	**8.9**	**13.7**	**45.1**	**3732.7**	**1.947**

The accident rate along the Seward Highway from MP 73 to 90 never dropped below a rate of 1.5 and rose and fell through a consistent cycle from 1995–2003. During this time period, the accident rate increased at an annual rate of 2.3 percent (Figure 2).

Figure 2



1.2 High Accident Locations

There are two high accident locations on the corridor within the study area; one is located at MP 52–52.5 and the second is at the MP 45–45.5 area. Fifty accidents have occurred at MP 52–52.5 including two fatalities over the ten most recent years of data. Of the fifty accidents that occurred at MP 52–52.5, thirty-six were curve-related accidents and 30 occurred on icy or snowy road conditions.

The MP 45 area has experienced 18 accidents over the last ten years of data. Thirteen of the eighteen accidents occurred at a curvature in the road and half were due to icy or snowy road conditions.

The frequency of accidents along a curvature in the roadway may be a result of a roadway design element. Out of the 299 accidents that occurred between Quartz Creek Road and Skilak Lake Road, 50 percent were curve-grade or –level parts of the roadway (Table 3). Further research needs to be conducted to determine if improvements of the highway require straightening to help correct the frequency of curve-related accidents particularly during winter months.

Table 3
Accidents by Road Character, 1994-2003

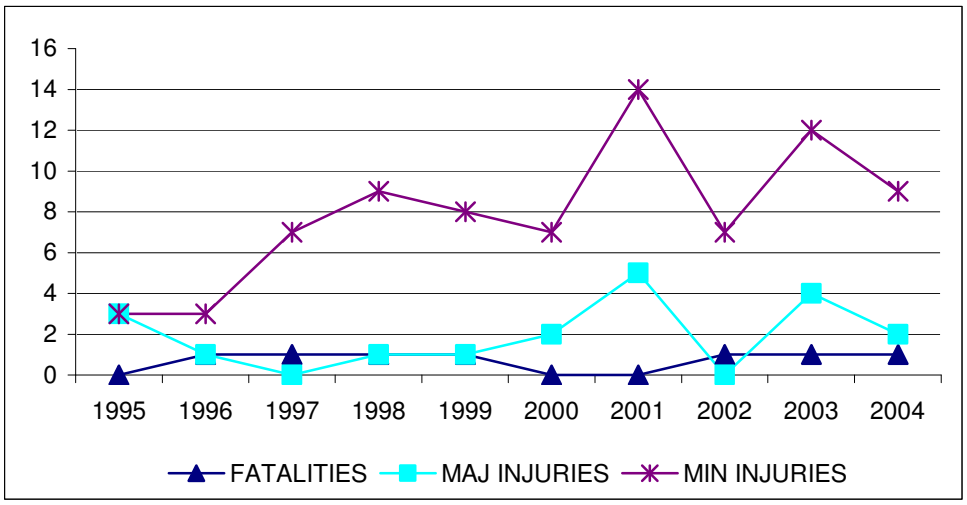
Road Character	Number of Accidents	% of Total
Straight level	77	25.8
Curve level	96	32.1
Curve at grade	52	17.4
Curve at hillcrest	4	1.3
Other	70	23.4
Total:	299	100

Both locations will need further monitoring for accident history. If an accident history continues, more data can be collected to improve the safety of these areas.

1.3 Fatal Injury Crashes

As illustrated below in Figure 3, the amount of fatalities over the ten year period has stayed consistent at zero or one fatality each year from 1995–2004. Major injuries have fluctuated over the same time period peaking in 2001 as the amount of minor injuries has reflected the same pattern.

Figure 3: Accident Severity



As previously mentioned there were seven fatal crashes within this time period resulting in eight deaths. According to data provided by ADOT&PF, each accident had a unique set of circumstances:

- Fatal Accident #1 took place on April 20, 1996 at MP 50.3. This was caused by a head-on collision involving four vehicles on dry pavement. Vehicle 1 was out of control while on a curvature in the roadway and Vehicle 2 appeared to be avoiding the collision. Vehicle 3 overturned as a result of the collision ahead which resulted in one fatality.

- Fatal Accident #2 occurred on May 19, 1997 at MP 56.9 during daylight hours. Vehicle 1 was changing lanes heading south around a curve when colliding with Vehicle 2 as it skid to avoid the collision which resulted in one fatality.

- Fatal Accident #3 took place on June 27, 1998 at MP 52.4. Vehicle #1 was making an improper lane change around "S" curves in the highway when having a collision head-on with Vehicle 2 which resulted in two fatalities.

- Fatal Accident #4 took place on October 9, 1999 at MP 49. There was only one vehicle involved in this accident and one fatality. The driver was driving at an unsafe speed around a curve under snowy road conditions and overturned into a ditch.

- Fatal Accident #5 took place on June 4, 2002 at Snug Harbor Road. This took place during twilight hours under dry pavement conditions and resulted in one fatality. It was caused by excessive drive speed and was alcohol-related. The only vehicle involved was moving eastbound before overturning into a culvert.

- Fatal Accident #6 took place at MP 50.5 on August 28, 2003. This was caused by a head-on collision involving two vehicles and one fatality. Vehicle 1 fell asleep while

driving a straight section of the highway and collided head on with Vehicle 2 as it was trying to avoid the collision but struck the guardrail along the roadway.

- Fatal Accident #7 took place on January 8, 2004 at Bean Creek Road. This was caused by Vehicle 1 driving at an unsafe speed and spun out of control during snowy conditions sliding into Vehicle 2. This accident resulted in one fatality.

Accidents where a fatality is involved require additional investigation to ensure that there are no correctable conditions that can be changed to ensure additional lives are not lost on the highway.