



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

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**Memorandum**

**TO:** Area and Division Traffic Engineers

**FROM:** S. A. Troy  
Traffic Safety Engineer

**SUBJECT: Standardized Crash Cost Estimates for North Carolina**

The Traffic Engineering and Safety Systems Branch periodically updates cost figures associated with traffic crashes for use by branch personnel for cost analyses. Increases in medical care and other inflationary costs can quickly render previously developed cost estimates obsolete.

The 2000 North Carolina crash costs include the cost associated with the average number of injuries in each crash type. For example, the average fatal crash in 2000 on North Carolina's roads contained 1.11 fatal injuries, 0.34 A injuries, 0.44 B injuries and 0.32 C injuries. The injury costs include estimates of medical costs, emergency services, loss of productivity, employer cost, property damage and change in quality of life. Table 1 shows the comprehensive cost of crashes by severity.

**Table 1** Comprehensive Cost Per Crash

<b>Crash Type</b>	<b>Cost Per Crash</b> 2000 Dollars
Fatal Crash	\$3,300,000
A Injury Crash	\$200,000
B Injury Crash	\$57,000
C Injury Crash	\$27,000
Property Damage only Crash	\$3,900
Average Crash	\$42,000
Non-Fatal Injury Crash	\$44,000

**Note:** All figures are rounded to two significant figures

Table 2 includes only the reportable crashes that occurred on public roads in 2000. Note that for various reasons, many traffic crashes are not reported. A traffic crash in North Carolina is defined as reportable if it involves an injury or total estimated property

damage of \$1,000 or more. A traffic crash is rated by the most severe injury involved in the incident. If a crash had eight people involved and seven people sustained C type injuries and one person sustained type A injuries, the crash is recorded as an A Injury crash. However, there were eight injuries. A property damage only crash is one in which no people were injured in the incident.

**Table 2 Number of Crashes Compared to the Number of Injuries in North Carolina during 2000**

	Number of Crashes	Number of Injuries
Fatal	1,415	1,567
A Injury	4,557	6,113
B Injury	23,142	32,420
C Injury	59,177	102,676
Property Damage Only	124,490	0
Unknown	4318	--

Source: The North Carolina Accident Database

Table 3 shows the average number of each type of injury that occurred in each crash severity category. These numbers were derived by totaling all the individual injuries that occurred in a severity category. The total is dividing by the total number of crashes in that category. For example, there were **1567 fatalities, 478 A injuries, 617 B injuries and 453 C injuries in 1415 fatal crashes**. If the number of injuries is divided by the number of crashes, then there was an average of 1.11 fatalities, 0.34 A injuries, 0.44 B injuries and 0.32 C injuries in each fatal crash.

**Table 3 Average Number of Injuries and Property Damage for Crashes**

Crash Type	Average Number of Fatal Injuries	Average Number of A Injuries	Average Number of B Injuries	Average Number of C Injuries
C Injury Crash	0	0	0	1.51
B Injury Crash	0	0	1.30	0.47
A Injury Crash	0	1.24	0.39	0.38
Fatal Crash	1.11	0.34	0.44	0.32

The cost per injury was obtained from Dr. Ted Miller of The Children's Safety Network Economics and Insurance Resource Center, a nationally recognized expert in the field. Table 4 shows a breakdown of the cost for each injury type. The Monetary cost considers only the cost of medical costs, emergency services, loss of productivity, employer cost, traffic delay and property damage. This cost is often considered “out of pocket” expenses. The comprehensive cost considers the pain and suffering associated with the injuries.

**Table 4 Cost per Injury in North Carolina**

	Fatal Injury	A Injury	B Injury	C Injury	Property Damage Only
Medical <sub>a</sub>	\$18,676	\$14,656	\$3,209	\$1,721	\$137
Emergency Services <sub>b</sub>	\$1,184	\$292	\$190	\$123	\$60
Victim Work Loss <sub>c</sub>	\$1,020,469	\$22,535	\$6,917	\$3,345	\$366
Employer Costs <sub>d</sub>	\$8,055	\$1,199	\$493	\$272	\$88
Traffic Delay <sub>e</sub>	\$488	\$212	\$205	\$174	\$251
Property Damage <sub>f</sub>	\$11,064	\$4,350	\$3,697	\$2,794	\$2,505
<b>MONETARY COST</b>	\$1,059,936	\$43,245	\$14,710	\$8,431	\$3,406
<b>Quality of Life<sub>g</sub></b>	\$1,865,164	\$101,551	\$22,776	\$9,485	\$497
<b>COMPREHENSIVE COST</b>	\$2,925,100	\$144,796	\$37,486	\$17,916	\$3,904

- a) **Medical** includes hospital, physician, rehabilitation, prescription and related cost.
- b) **Emergency Service** include police, fire, ambulance and helicopter services.
- c) **Victim Work Loss** includes wages, fringe benefits and household work.
- d) **Employer Cost** values time, the extra work and distractions for supervisors and coworkers that injuries cause.
- e) **Traffic Delay** values the time lost in traffic jams caused by crashes.
- f) **Property Damage** is the cost to repair or replace damaged vehicles and property.
- g) **Quality of Life** values the pain, suffering and quality of life that the family loses because of a death or injury.

**Source:** Ted Miller, Rebecca Spicer, Children's Safety Network Economics and Insurance Resource Center, PIRE, Calverton, MD; 2001

The cost per crash is calculated by multiplying the cost per injury from Table 4 and the average number of injuries per crash from Table 3. Table 5 shows the computations for fatal crashes in 2000. The cost associated with a crash includes all costs associated with each injury involved. The example of the fatal crash shows that the average fatal crash included 1.11 fatal injuries, 0.34 A injuries, 0.44 B injuries and 0.32 C injuries. The same type of calculation was completed for A, B, and C injury Crashes. Table 6 shows the results of these calculations.

**Table 5 Computation of Monetary and Comprehensive Cost Per Fatal Crash**

Injury	Number of Injuries (1)	Monetary Cost (2)	Comprehensive Cost (3)	Monetary Crash Cost (1) X (2)	Comprehensive Crash Cost (1) X (3)
Fatal Injury	1.11	\$1,059,936	\$2,925,100	\$1,176,529	\$3,246,872
A Injury	0.34	\$43,245	\$144,796	\$14,703	\$49,231
B Injury	0.44	\$14,710	\$37,486	\$6,472	\$16,494
C Injury	0.32	\$8,431	\$17,916	\$2,698	\$5,733
Total				\$1,200,402	\$3,094,556
<b>TOTAL (rounded to 2 significant figures)</b>				<b>\$1,200,000</b>	<b>\$3,300,000</b>

**Table 6 Monetary and Comprehensive Cost for Traffic Crashes In North Carolina**

	<b>Monetary</b>	<b>Comprehensive</b>
Fatal Crash	\$1,200,000	\$3,300,000
A Injury Crash	\$62,000	\$200,000
B Injury Crash	\$23,000	\$57,000
C Injury Crash	\$13,000	\$27,000
Property Damage Only Crash	\$3,400	\$3,900
Average Crash	\$17,000	\$42,000
Non-Fatal Injury Crash	\$18,000	\$44,000

It should be noted that the 2000 crash costs have decreased in almost every category when compared to the 1998 crash costs. The 1998 crash costs were derived from the 1993 crash costs by applying a Consumer Price Index (CPI) multiplier to numbers. It turns out that the CPI is not a very appropriate multiplier to apply to crash costs when estimating costs based off of work completed in previous years. The 2000 crash costs are based on real cost per injury data provided by Dr. Miller and were not derived from a previous year's cost figures.

If you have any questions regarding 2000 crash costs, please contact Brian Murphy at (919) 733-3668.

ST/bm