

The Likelihood of Human Casualty in Highway Crashes

Tenth Briefing: Proposed Research for 1996/1997

**Based on an Investigation Conducted for
the FHWA/NHTSA Crash Analysis Center
at George Washington University, Virginia**

**September 24, 1996
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"The Likelihood of Casualty in Highway Crashes"

Introduction

This tenth briefing concerning the cited subject addresses (a) proposed work for the 1996/1997 program; and (b) differences and difficulties encountered in the translation of injuries from the OIC, NASS pre-93, protocol to the AIS90, NASS post-92 protocol, and vice-versa.

Proposed Work for the 1996/1997 Program
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Introduction -- Although started, the research necessary to translate advance notification data, about highway crashes, either from vehicle mounted sensors at crash time or from emergency attendants at the scene, needs much further work to reach the maturity necessary for applications in making intelligent and effective decisions concerning the needed type and extent of emergency care. The proposed project aims at advancing the state of the art of the cited research.

Objectives -- The objectives of the proposed project are to advance the state of the art in translating pertinent information concerning crash, vehicle(s), and occupant(s) into information needed by emergency centers and emergency physicians, in order to deliver appropriate and effective services to crash victims, thus minimizing human losses and costs.

Methods of Research -- The primary method of research will include analyses and evaluations of: (a) crash, vehicle, and occupant attributes that can be sensed and emitted at crash time, and are deemed pertinent and potentially useful to the purpose of the project; (b) cited attributes that are deemed observable by emergency attendants at the crash scene; (c) the partition of the entire injury population into groups with injury attribute profiles carrying given implications of needed emergency care; (d) the availability of data cited under items a, b, and c above in the NHTSA and other crash records; (e) the search for useful correlations between items b and a, or between c and a; (f) the development of programmable probabilistic algorithms through multiple iterative procedures; (g) the estimation of error bounds for the probabilities of given casualty as a function of stipulated values of predictors; and (h) an evaluation and ranking of projected usefulness, as a function of algorithm complexity and demand for crash data.

Specific Topics

The cited research framework will include as a minimum the following topics:

- (i) Search for algorithms of rollover casualties, given that the resolution so far for the occurrence of such casualties is rather poor.
- (ii) Deal with the imperfections of translating AIS90 to OIC codes and vice versa. This is important if pre-93 data

are to be incorporated in the analyses.

- (iii) Deal with the effects of "unknowns" in the NASS data concerning both predicted responses and predictors.
- (iv) Develop algorithms based on a partial list of available predictors. For example delta V may not always be available, even for planar crashes.
- (v) Develop logic diagrams and procedures leading to an appropriate algorithm, based on actually available predictors, from a list of potentially available predictors.
- (vi) Conduct a sensitivity analysis of the predictive abilities of an algorithm, as a function of algorithm structure.
- (vii) Address and evaluate algorithms for: car fire occurrence and occupant entrapment, events requiring the dispatch of special equipment.
- (viii) Provide coverage for earlier NASS data: 1988-1992 concerning compelling injuries; and 1979-1986 for any casualty.
- (ix) Address and evaluate potentially useful algorithms for injured people other than car occupants, e.g. occupants of light trucks and vans, motorcyclists, bicyclists, and pedestrians.

Data Sources -- Given the resolution needed in the cited topics and methodology, the primary source of data for the proposed project will be the NASS/CDS for the years 1988-1995 currently available, plus the years to become available as the proposed project progresses.

Data will be used also from those available in earlier NASS years (NASS/CSS 1979-1987), and in the NCSS (1977-1979) records. These additional data certainly provide variables with the resolution desired in all aspects of the proposed project. They may be somehow dated but offer significant advantages: (i) a very much needed expansion of sample sizes; (ii) inclusion of all, as opposed to towaway only, police reported crashes; and (iii) an enhanced perspective.

Schedule and Deliverables

The cited project can be executed in the year October 1, 1996 to September 30, 1997. Informal briefings will be delivered as requested by the sponsor. A draft final report will be prepared before August 15, 1997. A final report, incorporating all revisions, will be delivered before September 30, 1997.

Table I. Assignment of Compelling or Noncompelling Nature to a Car Occupant Injury, based on an AIS90 to OIC Protocol Translation in the NASS 1995 File

Injury According to OIC Protocol				Compelling?		
Region	Organ	Lesion	AIS	Yes	No	Total
Back	Integum.	Abrasion	1	0	20872	20872
Back	Integum.	Contusion	1	0	60488	60488
Back	Integum.	Laceration	1	0	9740	9740
Back	Integum.	Unknown	1	0	245	245
Back	Integum.	Avulsion	1	0	223	223
Back	Muscle(s)	Strain	1	0	176869	176869
Chest	Integum.	Abrasion	1	0	57496	57496
Chest	Integum.	Contusion	1	0	447439	447439
Chest	Integum.	Laceration	1	0	20073	20073
Chest	Integum.	Unknown	1	0	64	64
Chest	Integum.	Avulsion	1	0	102	102
Chest	Skeletal	Contusion	1	0	4591	4591
Chest	Skeletal	Fracture	1	0	16227	16227
Chest	Skeletal	Unknown	1	0	610	610
Chest	Unknown	Strain	1	0	5885	5885
Elbow	Joint(s)	Dislocation	1	0	1361	1361
Elbow	Joint(s)	Sprain	1	0	8330	8330
Face	Digestive	Contusion	1	0	1662	1662
Face	Digestive	Laceration	1	0	22115	22115
Face	Digestive	Unknown	1	0	267	267
Face	Digestive	Avulsion	1	0	640	640
Face	Integum.	Abrasion	1	0	350745	350745
Face	Integum.	Burn	1	0	1219	1219
Face	Integum.	Contusion	1	0	457052	457052
Face	Integum.	Laceration	1	0	408638	408638
Face	Integum.	Unknown	1	0	2936	2936
Face	Integum.	Avulsion	1	0	12698	12698
Face	Joint(s)	Sprain	1	0	169	169
Face	Joint(s)	Unknown	1	0	53	53
Face	Nerve(s)	Unknown	1	0	43	43
Face	Eye(s)	Abrasion	1	0	6076	6076
Face	Eye(s)	Contusion	1	0	224	224
Face	Eye(s)	Laceration	1	0	359	359
Face	Eye(s)	Rupture	1	0	83	83
Face	Eye(s)	Unknown	1	0	1470	1470
Face	Skeletal	Dislocation	1	0	8593	8593
Face	Skeletal	Fracture	1	0	43656	43656
Face	Skeletal	Unknown	1	0	3701	3701
Face	Skeletal	Avulsion	1	0	7651	7651
Head	Brain	Concussion	1	0	55450	55450

Head	Ear(s)	Other	1	0	4962	4962
Head	Ear(s)	Rupture	1	0	259	259
Head	Ear(s)	Unknown	1	0	252	252
Head	Integum.	Abrasion	1	0	66557	66557
Head	Integum.	Burn	1	0	33	33
Head	Integum.	Contusion	1	0	203603	203603
Head	Integum.	Laceration	1	0	112273	112273
Head	Integum.	Unknown	1	0	3381	3381
Head	Integum.	Avulsion	1	0	2908	2908
Knee	Joint(s)	Contusion	1	0	169	169
Knee	Joint(s)	Unknown	1	0	6144	6144
Lower Leg	Skeletal	Contusion	1	0	66	66
Lower Leg	Unknown	Unknown	1	0	46	46
Abdmn	Urogenitl	Contusion	1	0	990	990
Abdmn	Urogenitl	Laceration	1	0	117	117
Abdmn	Urogenitl	Unknown	1	0	7	7
Abdmn	Integum.	Abrasion	1	0	28272	28272
Abdmn	Integum.	Contusion	1	0	135219	135219
Abdmn	Integum.	Laceration	1	0	913	913
Abdmn	Integum.	Unknown	1	0	490	490
Abdmn	Integum.	Avulsion	1	0	45	45
Abdmn	Gland(s)	Contusion	1	0	13	13
Abdmn	Gland(s)	Laceration	1	0	12	12
Abdmn	Gland(s)	Unknown	1	0	71	71
Neck	Integum.	Abrasion	1	0	41114	41114
Neck	Integum.	Contusion	1	0	31812	31812
Neck	Integum.	Laceration	1	0	8317	8317
Neck	Integum.	Unknown	1	0	523	523
Neck	Integum.	Avulsion	1	0	59	59
Neck	Muscle(s)	Strain	1	0	489487	489487
Neck	Gland(s)	Contusion	1	0	62	62
Pelvis	Joint(s)	Contusion	1	0	5038	5038
Pelvis	Joint(s)	Sprain	1	0	486	486
Ankle, Ft	Joint(s)	Contusion	1	0	1371	1371
Ankle, Ft	Joint(s)	Dislocation	1	0	2156	2156
Ankle, Ft	Joint(s)	Sprain	1	0	30714	30714
Ankle, Ft	Joint(s)	Unknown	1	0	301	301
Ankle, Ft	Skeletal	Fracture	1	0	2179	2179
Shldr	Joint(s)	Contusion	1	0	575	575
Shldr	Joint(s)	Sprain	1	0	44638	44638
Shldr	Joint(s)	Unknown	1	0	148	148
Unknown	Integum.	Abrasion	1	0	4388	4388
Unknown	Integum.	Burn	1	0	24	24
Unknown	Integum.	Contusion	1	0	36895	36895
Unknown	Integum.	Laceration	1	0	4234	4234
Unknown	Unknown	Other	1	0	33	33
Wrist Hnd	Joint(s)	Contusion	1	0	113	113
Wrist Hnd	Joint(s)	Dislocation	1	0	2752	2752
Wrist Hnd	Joint(s)	Sprain	1	0	33406	33406
Wrist Hnd	Joint(s)	Unknown	1	0	737	737

Wrist Hnd Muscle(s)	Laceration	1	0	724	724
Wrist Hnd Skeletal	Fracture	1	0	9057	9057
Wrist Hnd Skeletal	Unknown	1	0	12	12
Upr Limbs Arterial	Unknown	1	0	176	176
Upr Limbs Integum.	Abrasion	1	0	296995	296995
Upr Limbs Integum.	Burn	1	0	338	338
Upr Limbs Integum.	Contusion	1	0	555936	555936
Upr Limbs Integum.	Laceration	1	0	207561	207561
Upr Limbs Integum.	Unknown	1	0	4823	4823
Upr Limbs Integum.	Avulsion	1	0	10470	10470
Upr Limbs Muscle(s)	Laceration	1	0	1337	1337
Upr Limbs Muscle(s)	Unknown	1	0	21516	21516
Upr Limbs Nerve(s)	Contusion	1	0	42	42
Upr Limbs Nerve(s)	Laceration	1	0	85	85
Upr Limbs Nerve(s)	Unknown	1	0	234	234
Lwr Limbs Arterial	Laceration	1	0	30	30
Lwr Limbs Arterial	Unknown	1	0	9	9
Lwr Limbs Integum.	Abrasion	1	0	305419	305419
Lwr Limbs Integum.	Burn	1	0	100	100
Lwr Limbs Integum.	Contusion	1	0	828312	828312
Lwr Limbs Integum.	Laceration	1	0	143444	143444
Lwr Limbs Integum.	Unknown	1	0	868	868
Lwr Limbs Integum.	Avulsion	1	0	3367	3367
Lwr Limbs Muscle(s)	Unknown	1	0	5075	5075

Subtotals for AIS=1

0 5920409 5920409

Upper Arm Skeletal	Fracture	2	0	7300	7300
Back Spine	Contusion	2	0	97	97
Back Skeletal	Fracture	2	0	24527	24527
Back Vertebrae	Dislocation	2	0	957	957
Back Vertebrae	Rupture	2	0	407	407
Chest Heart	Laceration	2	0	703	703
Chest Heart	Unknown	2	0	57	57
Chest Integum.	Laceration	2	0	21	21
Chest Lung(s)	Contusion	2	0	70	70
Chest Lung(s)	Laceration	2	0	296	296
Chest Skeletal	Fracture	2	0	26358	26358
Elbow Joint(s)	Laceration	2	0	278	278
Face Digestive	Laceration	2	0	581	581
Face Integum.	Laceration	2	0	1581	1581
Face Integum.	Avulsion	2	0	784	784
Face Joint(s)	Dislocation	2	0	460	460
Face Eye(s)	Detachment	2	0	48	48
Face Eye(s)	Laceration	2	0	181	181
Face Eye(s)	Avulsion	2	0	18	18
Face Skeletal	Fracture	2	0	26975	26975
Head Brain	Concussion	2	7244	96911	104155
Head Integum.	Laceration	2	0	2397	2397

Head	Integum.	Avulsion	2	0	130	130
Head	Nerve(s)	Contusion	2	0	48	48
Head	Nerve(s)	Laceration	2	0	696	696
Head	Nerve(s)	Unknown	2	0	270	270
Head	Skeletal	Fracture	2	0	5405	5405
Knee	Joint(s)	Dislocation	2	0	595	595
Knee	Joint(s)	Laceration	2	0	2177	2177
Knee	Joint(s)	Sprain	2	0	14737	14737
Knee	Muscle(s)	Laceration	2	0	1043	1043
Knee	Skeletal	Fracture	2	0	6998	6998
Lower Leg	Skeletal	Fracture	2	0	13201	13201
Abdmn	Arterial	Unknown	2	0	82	82
Abdmn	Digestive	Contusion	2	0	3637	3637
Abdmn	Digestive	Laceration	2	0	2174	2174
Abdmn	Digestive	Unknown	2	0	357	357
Abdmn	Urogenitl	Contusion	2	0	1295	1295
Abdmn	Urogenitl	Laceration	2	93	167	260
Abdmn	Urogenitl	Unknown	2	0	64	64
Abdmn	Integum.	Laceration	2	82	14	96
Abdmn	Kidney(s)	Contusion	2	0	4114	4114
Abdmn	Kidney(s)	Laceration	2	0	412	412
Abdmn	Kidney(s)	Unknown	2	0	22	22
Abdmn	Liver	Contusion	2	0	3173	3173
Abdmn	Liver	Laceration	2	0	7545	7545
Abdmn	Liver	Unknown	2	0	68	68
Abdmn	Spleen	Contusion	2	0	2194	2194
Abdmn	Spleen	Laceration	2	0	5417	5417
Abdmn	Spleen	Unknown	2	0	353	353
Abdmn	Respirtry	Contusion	2	0	10	10
Abdmn	Gland(s)	Contusion	2	0	14	14
Neck	Digestive	Unknown	2	0	24	24
Neck	Respirtry	Laceration	2	0	176	176
Neck	Respirtry	Unknown	2	0	20	20
Neck	Skeletal	Fracture	2	0	6444	6444
Neck	Vertebrae	Dislocation	2	0	1058	1058
Neck	Vertebrae	Rupture	2	0	56	56
Pelvis	Joint(s)	Dislocation	2	0	2105	2105
Pelvis	Skeletal	Fracture	2	0	14252	14252
Ankle, Ft	Joint(s)	Dislocation	2	0	3573	3573
Ankle, Ft	Joint(s)	Laceration	2	0	9	9
Ankle, Ft	Muscle(s)	Laceration	2	0	378	378
Ankle, Ft	Skeletal	Fracture	2	0	39887	39887
Forearm	Skeletal	Fracture	2	0	19548	19548
Shldr	Joint(s)	Dislocation	2	0	16899	16899
Shldr	Skeletal	Fracture	2	0	25028	25028
Thigh	Nerve(s)	Contusion	2	0	150	150
Thigh	Nerve(s)	Unknown	2	0	29	29
Thigh	Skeletal	Fracture	2	0	126	126
Unknown	Integum.	Burn	2	0	46	46
Wrist Hnd	Joint(s)	Dislocation	2	0	517	517

Wrist Hnd Skeletal	Fracture	2	0	14427	14427
Wrist Hnd Skeletal	Unknown	2	0	956	956
Wrist Hnd All	Amputation	2	0	67	67
Wrist Hnd All	Crush	2	0	493	493
Upr Limbs Integum.	Avulsion	2	0	12	12
Upr Limbs Muscle(s)	Laceration	2	0	877	877
Upr Limbs Nerve(s)	Laceration	2	0	456	456
Upr Limbs Skeletal	Fracture	2	0	6170	6170
Upr Limbs Unknown	Unknown	2	0	66	66
Lwr Limbs Integum.	Burn	2	0	248	248
Lwr Limbs Integum.	Laceration	2	0	508	508
Lwr Limbs Integum.	Avulsion	2	0	101	101
Lwr Limbs Muscle(s)	Laceration	2	0	1910	1910
Lwr Limbs Nerve(s)	Laceration	2	0	85	85
Lwr Limbs Nerve(s)	Unknown	2	0	20	20
Lwr Limbs Unknown	Unknown	2	166	0	166
Lwr Limbs All	Crush	2	254	0	254

Subtotals for AIS=2			7839	424140	431979
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Upper Arm Skeletal	Fracture	3	0	15444	15444
Back Spine	Contusion	3	351	0	351
Back Skeletal	Fracture	3	0	2507	2507
Back Vertebrae	Dislocation	3	0	28	28
Back Vertebrae	Rupture	3	0	79	79
Chest Arterial	Laceration	3	174	0	174
Chest Heart	Contusion	3	0	2091	2091
Chest Heart	Laceration	3	156	0	156
Chest Lung(s)	Contusion	3	6455	2923	9378
Chest Lung(s)	Laceration	3	371	1501	1872
Chest Lung(s)	Unknown	3	0	35	35
Chest Respirtry	Contusion	3	0	31	31
Chest Respirtry	Other	3	0	81	81
Chest Skeletal	Fracture	3	8933	8395	17328
Chest Unknown	Unknown	3	5743	0	5743
Face Skeletal	Fracture	3	3853	0	3853
Head Brain	Contusion	3	7001	0	7001
Head Brain	Concussion	3	3219	0	3219
Head Brain	Unknown	3	12685	2302	14987
Head Skeletal	Fracture	3	3929	4099	8028
Knee Arterial	Laceration	3	96	0	96
Knee Muscle(s)	Laceration	3	0	168	168
Lower Leg Skeletal	Fracture	3	0	8789	8789
Abdmn Arterial	Laceration	3	433	0	433
Abdmn Arterial	Unknown	3	123	0	123
Abdmn Digestive	Laceration	3	1004	271	1275
Abdmn Urogenitl	Laceration	3	111	33	144
Abdmn Kidney(s)	Contusion	3	143	0	143
Abdmn Kidney(s)	Laceration	3	0	75	75

Abdmn	Liver	Contusion	3	852	0	852
Abdmn	Liver	Laceration	3	1463	0	1463
Abdmn	Spleen	Contusion	3	180	0	180
Abdmn	Spleen	Laceration	3	0	916	916
Abdmn	Spleen	Rupture	3	0	837	837
Abdmn	Respirtry	Laceration	3	1331	0	1331
Abdmn	Unknown	Unknown	3	0	229	229
Neck	Arterial	Laceration	3	67	0	67
Neck	Spine	Contusion	3	255	0	255
Neck	Respirtry	Laceration	3	11	11	22
Neck	Skeletal	Fracture	3	3352	0	3352
Neck	Vertebrae	Dislocation	3	304	0	304
Neck	Vertebrae	Rupture	3	0	11	11
Pelvis	Joint(s)	Detachment	3	0	1816	1816
Pelvis	Skeletal	Fracture	3	9055	0	9055
Ankle, Ft	Skeletal	Fracture	3	0	858	858
Forearm	Skeletal	Fracture	3	0	15090	15090
Thigh	Arterial	Unknown	3	0	30	30
Thigh	Nerve(s)	Laceration	3	0	34	34
Thigh	Skeletal	Fracture	3	0	21372	21372
Unknown	Integum.	Burn	3	0	91	91
Wrist Hnd	Integum.	Avulsion	3	0	185	185
Wrist Hnd	All	Crush	3	0	303	303
Upr Limbs	Arterial	Laceration	3	0	11	11
Upr Limbs	All	Amputation	3	429	0	429
Upr Limbs	All	Crush	3	60	0	60
Lwr Limbs	Integum.	Avulsion	3	0	68	68
Lwr Limbs	All	Amputation	3	330	0	330

Subtotals for AIS=3				72469	90714	163183
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Back	Spine	Contusion	4	188	0	188
Chest	Arterial	Laceration	4	988	10	998
Chest	Heart	Contusion	4	250	0	250
Chest	Lung(s)	Contusion	4	5035	0	5035
Chest	Lung(s)	Laceration	4	777	0	777
Chest	Respirtry	Laceration	4	14	0	14
Chest	Skeletal	Fracture	4	5348	0	5348
Chest	Unknown	Unknown	4	80	0	80
Head	Arterial	Laceration	4	53	0	53
Head	Brain	Contusion	4	558	0	558
Head	Brain	Concussion	4	2542	24	2566
Head	Brain	Laceration	4	1472	0	1472
Head	Brain	Unknown	4	11768	0	11768
Head	Skeletal	Fracture	4	3323	0	3323
Abdmn	Arterial	Laceration	4	36	0	36
Abdmn	Digestive	Laceration	4	407	0	407
Abdmn	Urogenitl	Laceration	4	716	0	716
Abdmn	Kidney(s)	Laceration	4	272	0	272

Abdmn	Liver	Laceration	4	1711	0	1711
Abdmn	Liver	Rupture	4	234	0	234
Abdmn	Spleen	Laceration	4	1825	0	1825
Neck	Arterial	Laceration	4	0	14	14
Neck	Spine	Contusion	4	1176	0	1176
Pelvis	All	Crush	4	32	0	32
Lwr Limbs	All	Amputation	4	18	0	18

Subtotals for AIS=4				38823	48	38871
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Back	Spine	Laceration	5	294	0	294
Chest	Arterial	Laceration	5	115	827	942
Chest	Digestive	Laceration	5	47	0	47
Chest	Heart	Laceration	5	905	0	905
Chest	Heart	Unknown	5	24	0	24
Chest	Lung(s)	Laceration	5	221	0	221
Chest	Respirtry	Laceration	5	47	0	47
Chest	Skeletal	Fracture	5	1899	0	1899
Chest	Unknown	Unknown	5	56	0	56
Head	Arterial	Laceration	5	19	0	19
Head	Brain	Contusion	5	554	0	554
Head	Brain	Concussion	5	5320	0	5320
Head	Brain	Unknown	5	6158	0	6158
Abdmn	Arterial	Laceration	5	112	0	112
Abdmn	Digestive	Laceration	5	213	0	213
Abdmn	Kidney(s)	Laceration	5	9	0	9
Abdmn	Liver	Laceration	5	567	0	567
Abdmn	Spleen	Laceration	5	1005	0	1005
Neck	Spine	Contusion	5	265	0	265
Neck	Spine	Laceration	5	205	0	205
Pelvis	All	Crush	5	292	0	292
Unknown	Integum.	Burn	5	0	54	54

Subtotals for AIS=5				18327	881	19208
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Chest	Arterial	Laceration	6	1132	0	1132
Chest	Heart	Laceration	6	399	0	399
Chest	Heart	Rupture	6	121	0	121
Chest	All	Crush	6	477	0	477
Head	Brain	Laceration	6	1132	0	1132
Head	All	Crush	6	1046	0	1046
Neck	Spine	Contusion	6	67	0	67
Neck	Spine	Laceration	6	78	0	78
Unknown	Integum.	Burn	6	0	1413	1413

Subtotals for AIS=6				4452	1413	5865
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Chest	Unknown	Unknown	7	0	11830	11830
Head	Brain	Unknown	7	0	256	256
Head	Unknown	Unknown	7	0	12862	12862
Abdmn	Unknown	Unknown	7	0	2937	2937
Neck	All	Unknown	7	0	237	237
Subtotals for AIS=7 (Unknown)				0	28122	28122
Totals (All Injuries)				141910	6465727	6607637

Table II. Ambivalent Compelling/Noncompelling Characterization of Injuries Appearing in Table I

Injury According to OIC Protocol				Compelling?		
Region	Organ	Lesion	AIS	Yes	No	Total
Head	Brain	Concussion	2	7244	96911	104155
Abdmn	Urogenitl	Laceration	2	93	167	260
Abdmn	Integum.	Laceration	2	82	14	96
Subtotals for AIS=2				7419	97092	104511
Chest	Lung(s)	Contusion	3	6455	2923	9378
Chest	Lung(s)	Laceration	3	371	1501	1872
Chest	Skeletal	Fracture	3	8933	8395	17328
Head	Brain	Unknown	3	12685	2302	14987
Head	Skeletal	Fracture	3	3929	4099	8028
Abdmn	Digestive	Laceration	3	1004	271	1275
Abdmn	Urogenitl	Laceration	3	111	33	144
Neck	Respirtry	Laceration	3	11	11	22
Subtotals for AIS=3				33499	19535	53034
Chest	Arterial	Laceration	4	988	10	998
Head	Brain	Concussion	4	2542	24	2566
Subtotals for AIS=4				3530	34	3564
Chest	Arterial	Laceration	5	115	827	942
Totals				44563	117488	162051

Table III. Detailed Tabulation of the Ambivalent Injuries Summarized in Table II

Injury According to OIC Protocol				Compelling?	
Region	Organ	Lesion	AIS	After	AIS90 Code
Head	Brain	Concussion	2	No	160202.2
Head	Brain	Concussion	2	No	160406.2
Head	Brain	Concussion	2	No	160410.2
Head	Brain	Concussion	2	No	160414.2
Head	Brain	Concussion	2	No	160699.2
Head	Brain	Concussion	2	No	161000.2
Head	Brain	Concussion	2	Yes	160404.2
Head	Brain	Concussion	2	Yes	160602.2
Head	Brain	Concussion	2	Yes	160606.2
Head	Brain	Concussion	2	Yes	160610.2
Abdmn	Urogenitl	Laceration	2	No	540620.2
Abdmn	Urogenitl	Laceration	2	Yes	544024.2
Abdmn	Integum.	Laceration	2	No	590604.2
Abdmn	Integum.	Laceration	2	Yes	543224.2
Chest	Lung(s)	Contusion	3	No	441402.3
Chest	Lung(s)	Contusion	3	Yes	441406.3
Chest	Lung(s)	Laceration	3	No	441430.3
Chest	Lung(s)	Laceration	3	No	441802.3
Chest	Lung(s)	Laceration	3	Yes	441414.3
Chest	Lung(s)	Laceration	3	Yes	441416.3
Chest	Skeletal	Fracture	3	No	450214.3
Chest	Skeletal	Fracture	3	No	450222.3
Chest	Skeletal	Fracture	3	Yes	450230.3
Chest	Skeletal	Fracture	3	Yes	450250.3
Head	Brain	Unknown	3	No	140660.3
Head	Brain	Unknown	3	No	140682.3
Head	Brain	Unknown	3	Yes	140454.3
Head	Brain	Unknown	3	Yes	140466.3
Head	Brain	Unknown	3	Yes	140662.3
Head	Brain	Unknown	3	Yes	140668.3
Head	Brain	Unknown	3	Yes	140670.3
Head	Brain	Unknown	3	Yes	140684.3
Head	Brain	Unknown	3	Yes	140699.3

Head	Skeletal	Fracture	3	No	150200.3
Head	Skeletal	Fracture	3	No	150202.3
Head	Skeletal	Fracture	3	Yes	150204.3
Head	Skeletal	Fracture	3	Yes	150404.3
Abdmn	Digestive	Laceration	3	No	541020.3
Abdmn	Digestive	Laceration	3	No	541022.3
Abdmn	Digestive	Laceration	3	No	542824.3
Abdmn	Digestive	Laceration	3	Yes	540824.3
Abdmn	Digestive	Laceration	3	Yes	541224.3
Abdmn	Digestive	Laceration	3	Yes	541424.3
Abdmn	Digestive	Laceration	3	Yes	542024.3
Abdmn	Urogenitl	Laceration	3	No	545024.3
Abdmn	Urogenitl	Laceration	3	Yes	545026.3
Neck	Respirtry	Laceration	3	No	340606.3
Neck	Respirtry	Laceration	3	Yes	340208.3
Chest	Arterial	Laceration	4	No	421606.4
Chest	Arterial	Laceration	4	Yes	420202.4
Chest	Arterial	Laceration	4	Yes	420206.4
Chest	Arterial	Laceration	4	Yes	420208.4
Chest	Arterial	Laceration	4	Yes	420606.4
Chest	Arterial	Laceration	4	Yes	421008.4
Chest	Arterial	Laceration	4	Yes	421806.4
Head	Brain	Concussion	4	No	160616.4
Head	Brain	Concussion	4	Yes	160804.4
Head	Brain	Concussion	4	Yes	160808.4
Head	Brain	Concussion	4	Yes	160812.4
Head	Brain	Concussion	4	Yes	160820.4
Chest	Arterial	Laceration	5	No	420210.5
Chest	Arterial	Laceration	5	No	420212.5
Chest	Arterial	Laceration	5	No	420214.5
Chest	Arterial	Laceration	5	Yes	420216.5
Chest	Arterial	Laceration	5	Yes	420800.5

