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Research Note

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Injuries Associated With Hazards Involving Motor Vehicle “Jack Failures”

NHTSA’s National Center for Statistics and Analysis (NCSA) recently examined data from the Consumer Product Safety Commission’s (CPSC) National Electronic Injury Surveillance System (NEISS) on cases involving injuries associated with motor vehicle “jack failures.” Jacks are devices used to lift a motor vehicle off the ground for servicing or other repairs. “Jack failures” are defined as situations in which the vehicle is believed to have moved either as a result of the jack or car shifting, or as a result of the jack collapsing or losing pressure needed to hold the vehicle. NEISS data on persons treated in hospital emergency rooms for these injuries were examined to determine the action and activity involved in producing the injury, the injury diagnosis and severity, the body region most often injured, and the age of the injured person.

CPSC’s NEISS collects data on a nationally representative sample of consumer product-related injuries treated in hospital emergency rooms. NEISS is a 3-level system consisting of surveillance of emergency room injuries, follow-back telephone interviews with injured persons or witnesses, and comprehensive investigations with injured persons and/or witnesses. NEISS obtained data from sample of 79 of the 6,127 hospitals nationwide with at least six beds that provide emergency care on a continuing 24-hour basis. The data on injuries associated with motor vehicle jack failures were obtained through an agreement between NHTSA and CPSC to collect data on injuries associated with specific motor vehicle hazards that may not involve a police-reported motor vehicle crash.

Incidents that do not involve a police-reported motor vehicle crash would not be captured in NHTSA’s major crash data collection systems, e.g., the Fatality Analysis Reporting System (FARS), the National Automotive Sampling System (NASS) and Special Crash Investigations (SCI).

For this study, follow-back interviews were not conducted. The CPSC’s NEISS data were used to take a preliminary look at jack failures to get an idea of the extent of the problem. Typically, follow-back interviews are conducted to obtain a more detailed description of each incident. However, funding limitations precluded this from being done in the present instance. NHTSA has used NEISS data previously to examine injuries related to other specific types of hazards involving motor vehicles (see NHTSA Research Notes: *Injuries Associated with Hazards Involving Motor Vehicle Power Windows*, May 1997; *Injuries Associated with Hazards Involving Motor Vehicle Batteries*, July 1997; and *Injuries Associated with Hazards Involving Motor Vehicle “Rollaways,”* July 1998).

During a one-year study period, November 1, 1994 through October 31, 1995, data from 102 cases of injuries associated with motor vehicle-related jack failures were obtained from NEISS. Based upon these 102 cases, an estimated 4,822 persons nationwide were treated in hospital emergency rooms for injuries resulting from the failure of a jack while engaged in an activity involving a motor vehicle during the one-year period. Tables 1 through 9 provide additional

details on the persons injured in incidents involving motor vehicle jack failures by the action or situation which produced the injury, the most severely injured part of the body, the injury diagnosis and severity, and the age and sex of the injured person, respectively. (The percentages may not add to 100% in every table due to rounding.)

As shown in Table 1, the types of situations reported by persons injured by motor vehicle jack failures appear to be associated with the jack or vehicle slipping and falling or the jack itself failing or losing pressure causing the vehicle being lifted to drop. Approximately three-fourths (74%) of the persons injured in motor vehicle jack failures were injured as a result of being struck by the vehicle as it fell from the jack. Eighteen percent of those injured sustained injuries as a result of the jack collapsing or losing pressure while in use. The remaining 8 percent sustained injuries as a result of unspecified or possible jack failures for which insufficient details were given.

Table 1
Estimated Number of Persons Injured in
MV Jack Failures by Injury Producing Action
November 1994 - October 1995

| Injury Producing Action | Estimated Persons Injured | % Total |
|---------------------------------------|---------------------------|-------------|
| Jack or Vehicle Slipped/Fell | 3,567 | 74% |
| Jack Failed/Gave out or Lost Pressure | 866 | 18% |
| Possible or Unspecified Jack Failure | 389 | 8% |
| Total | 4,822 | 100% |

About 81 percent (3,914) of the vehicles involved in motor vehicle jack failures during the study period were classified as passenger cars. Trucks of unknown type comprise 13 percent (646) of the estimated injuries. These include trucks and motor homes of unspecified size and weight. Light trucks, such as pickups, accounted for 1 percent and the other 5 percent is made up

of vehicles for which the type is unknown. These numbers are shown in Table 2.

Table 2
Estimated Number of Persons Injured in MV
Jack Failures by Vehicle Type
November 1994 - October 1995

| Vehicle Type | Estimated Persons Injured | % Total |
|---------------------|---------------------------|-------------|
| Passenger Cars | 3,914 | 81% |
| Truck, Type Unknown | 646 | 13% |
| Light Trucks | 45 | 1% |
| Not Reported | 217 | 5% |
| Total | 4,822 | 100% |

It is estimated that at the time of the jack failure about 1,938 persons (40%) were utilizing the jack to facilitate the repair of the vehicle in some way. Another 913 (19%) persons were injured as they used the jack to lift the vehicle while attempting to change a tire. Of the remaining estimated 1,971 injured persons, 244 (5%) of them were using the jack to raise or lower the vehicle for some unspecified purpose and the other 1,727 (36%) were engaged in unspecified motor vehicle-related activities. This can be seen in Table 3.

Table 3
Estimated Number of Persons Injured in MV
Jack Failures by Activity at Time of Incident
November 1994 - October 1995

| Activity | Estimated Persons Injured | % Total |
|-----------------------------------|---------------------------|-------------|
| Repairing Vehicle | 1,938 | 40% |
| Changing Tire | 913 | 19% |
| Using Jack to Raise/Lower Vehicle | 244 | 5% |
| Unspecified/Unknown | 1,727 | 36% |
| Total | 4,822 | 100% |

Table 4 presents the injury severity distribution for the estimated number of persons injured by motor vehicle jack failures. While about 9 percent (446) of those injured received a serious diagnosis, the majority, about 85 percent, sustained minor (45%) to moderate injuries (40%). The severity of the injuries for the remaining 5 percent was not reported.

Table 4
Estimated Number of Persons Injured in MV
Jack Failures by Injury Severity
November 1994 - October 1995

| Injury Severity | Estimated Persons Injured | %Total |
|-----------------|---------------------------|-------------|
| Minor | 2,177 | 45% |
| Moderate | 1,950 | 40% |
| Serious | 446 | 9% |
| Not Reported | 249 | 5% |
| Total | 4,822 | 100% |

Almost all (96%) of the estimated number of persons injured in jack failure incidents were treated and released, as shown in Table 5. Less than half of those persons estimated to have received serious injuries required hospitalization 214 (4%) [see Table 4].

Table 5
Estimated Number of Persons Injured in MV
Jack Failures by Medical Disposition
November 1994 - October 1995

| Medical Disposition | Estimated Persons Injured | % Total |
|----------------------|---------------------------|-------------|
| Treated and Released | 4,608 | 96% |
| Hospitalized | 214 | 4% |
| Total | 4,822 | 100% |

Looking at Table 6, we see the types of injuries suffered in jack failure incidents. It is estimated that 1,904 persons, or 40 percent of those

injured in these situations, were diagnosed with contusions. Eighteen percent (18%) were diagnosed as having lacerations, another 15 percent (733) were diagnosed with fractures, 10 percent (461) were diagnosed with strains or sprains, and about 5 percent (223) were diagnosed with amputations. For the remaining 610 estimated injured persons, the injury diagnosis ranged from dental injuries and avulsions, to internal organ injuries.

Table 6
Estimated Number of Persons Injured in MV
Jack Failures by Injury Diagnosis
November 1994 - October 1995

| Diagnosis | Estimated Persons Injured | %Total |
|---------------|---------------------------|-------------|
| Contusion | 1,904 | 40% |
| Laceration | 891 | 18% |
| Fracture | 733 | 15% |
| Other | 610 | 13% |
| Strain/Sprain | 461 | 10% |
| Amputation | 223 | 5% |
| Total | 4,822 | 100% |

* Other includes dental injuries, avulsions, and internal organ injuries.

About 1,879 (39%) of those persons injured in jack failure incidents sustained most severe injuries to either the hand, wrist or finger. An estimated 834 persons suffered most severe injuries to the upper trunk of the body (17%), followed by 745 injuries to the head, neck or face (15%), 490 (10%) injuries to the shoulder, about 314 (7%) injuries to the arm, 244 to the foot (5%), 189 to the lower trunk (4%) and about 2 percent of the most severe injuries were divided almost equally between the leg (68) and 25-50% of the body (60), as shown in Table 7.

Table 7
Estimated Number of Persons Injured in MV
Jack Failures by Most Severely Injured Body Region
November 1994 - October 1995

| Body Part Injured | Estimated Persons Injured | %Total |
|-------------------|---------------------------|-------------|
| Hand/Wrist/Finger | 1,879 | 39% |
| Upper Trunk | 834 | 17% |
| Head/Face/Neck | 745 | 15% |
| Shoulder | 490 | 10% |
| Arm | 314 | 7% |
| Foot | 244 | 5% |
| Lower Trunk | 189 | 4% |
| Leg | 68 | 1% |
| 25-50% of Body | 60 | 1% |
| Total | 4,822 | 100% |

Of the estimated 4,822 injured persons, no women were injured in these jack failure incidents as Table 8 shows. One hundred percent of those injured were men. One should not conclude that women are never injured in jack failure incidents, only that it is relatively infrequent, and cannot be estimated from this sample.

Table 8
Estimated Number of Persons Injured in MV
Jack Failures by Gender
November 1994 - October 1995

| Gender | Estimated Persons Injured | %Total |
|--------------|---------------------------|-------------|
| Male | 4,822 | 100% |
| Total | 4,822 | 100% |

Table 9 presents the distribution, by age, of the estimated number of persons injured in incidents involving motor vehicle jack failures. Three age groups 15 - 24 years (22%), 25 - 34 years (33%), and 35 - 44 years (27%) represent an

estimated 82 percent of those injured. The number of persons injured in those age groups is approximately 3,922. For persons 45 years and older, the numbers break down this way, 45 - 54 years old, 375 persons or 8 percent, 55 - 64 years old, 162 persons (3%), and those 65 years and older, 252 persons injured (5%). As expected, there were relatively few injuries sustained by persons younger than 15 years of age, only 111 persons injured (2%).

Table 9
Estimated Number of Persons Injured
in MV Jack Failures by Age
November 1994 - October 1995

| Age of Person | Estimated Persons Injured | % Total |
|---------------|---------------------------|-------------|
| 0 - 14 Years | 111 | 2% |
| 15 - 24 Years | 1,046 | 22% |
| 25 - 34 Years | 1,578 | 33% |
| 35 - 44 Years | 1,298 | 27% |
| 45 - 54 Years | 375 | 8% |
| 55 - 64 Years | 162 | 3% |
| Over 65 Years | 252 | 5% |
| Total | 4,822 | 100% |

For additional copies of this research note, please call (202) 366-4198 or toll free, 1-800-934-8517. For questions, please contact Keith Poindexter at (202) 366-0018 or Kenneth Hardie at (202) 366-6987. This research note and other general information on traffic safety may be accessed by Internet users at <http://www.nhtsa.dot.gov/people/ncsa>.