

# **Stunt Related Injuries in the Motion Picture and Film Industry: A Literature Review**

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January 2012

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## Introduction

This literature review was undertaken to review the status of academic and non-academic sources for stunt related injuries on behalf of Actsafe. The review focuses on available resources pertaining to all aspects of stunt work and surveillance of the current British Columbian workforce (see Appendix 1 for literature search strategy).

## Results

Stunt work encompasses a diverse field of production but can be broadly defined as any action sequence that involves an elevated risk of injury to performers or others on the set or stage (ILO 1998).

To maintain productivity and efficiency, increasingly stunt performers are required to execute dangerous stunts realistically and in the least time possible. If a stunt must be filmed multiple times, expenses to production rise considerably as all actors, stunt performers, extras and props must be returned to their “pre-stunt” look (McCann 1990). As a result, stunt performers may face considerable pressure to perform regardless of comfort or risk of injury. This dangerous work is evidenced by many workers’ compensation bodies that do not extend coverage to individuals who perform stunts in films, videos, theatrical, or live performances (Kristman et al 2010).

## Workforce

As of 2007, Canada had approximately 700 stunt performers unionized under the Union of British Columbia Performers (UBCP) and/or the Alliance of Canadian Cinema, Television and Radio Artists (Mylrea 2007). Of these 700 stunt performers it is reported that approximately one third constitute full time stunt performers (Mylrea 2007). Alternatively, the United States had approximately 7,200 stunt performers all unionized under the Screen Actor’s Guild (SAG) (McMichael 2007).

While stunt work requires a variety of body types and ethnicities, stunt professionals are predominately Caucasian males. As of 2007 for the industry in Western Canada, primarily Vancouver, the proportion was 285 males to 68 females (Mylrea 2007). Of these, 206 males and 60 females identified as Caucasian (Mylrea 2007). Stunt performers exist in a wide age range (18-60) with the average in the mid-30s (McMichael 2007).

## Injury Statistics – United States

The Center for Safety in the Arts compiled a list of 40 fatalities from 1980-89 in motion picture and television production (McCann 1991). The list encompassed American productions and productions shot abroad by American companies/subsidiaries. During this period, 40 fatalities were recorded. 21 of these fatalities occurred during stunt performance (McCann 1991). Interestingly, only 8 of the 21 stunt fatalities involved stunt performers themselves; the other stunt fatalities included 6 actors, 4 camera persons, 2 bystanders and 1 pilot. A list of these fatalities can be found in Appendix 2. While stunt performers are evidently at risk of serious injury, these figures indicate that other individuals on set also face elevated risk during the performance of stunts. The

lack of proper emergency medical care has been considered a contributing factor in several of these filming fatalities.

Fatalities are only one indicator of the health and safety of stunt performers. One study carried out by the SAG, based on accident reports submitted by member companies of the Alliance of Motion Picture and Television Producers, reported 600 injuries and illnesses in SAG members between 1982 and 1984 (McCann 1990). Of those injured, 53% were stunt performers. Approximately 80% of the injuries occurred while filming. In addition, approximately 80% occurred on location, as compared to in studios (McCann 1990).

A second study by SAG found that 4,998 SAG members were injured from 1982 to 1986 on motion picture and television locations (McCann1988). During this period, a 41% increase in overall compensable injuries and a general increase in stunt related injuries was concluded. However, changes in the number of professionals employed within the industry, as well as any potential changes in the definition of compensable injuries did not appear to be taken into account, raising questions about the validity of the conclusions drawn.

### Injury Statistics – British Columbia

A WorkSafe BC report provided detailed claims statistics between 2002-2006 for individuals who identified as stuntmen/stuntwomen (WorkSafeBC 2007). During this period, a total of 43 short term disability (30 days of lost time or less), long term disability (greater than 30 days of lost time) or fatality claims were accepted (Fig 1).

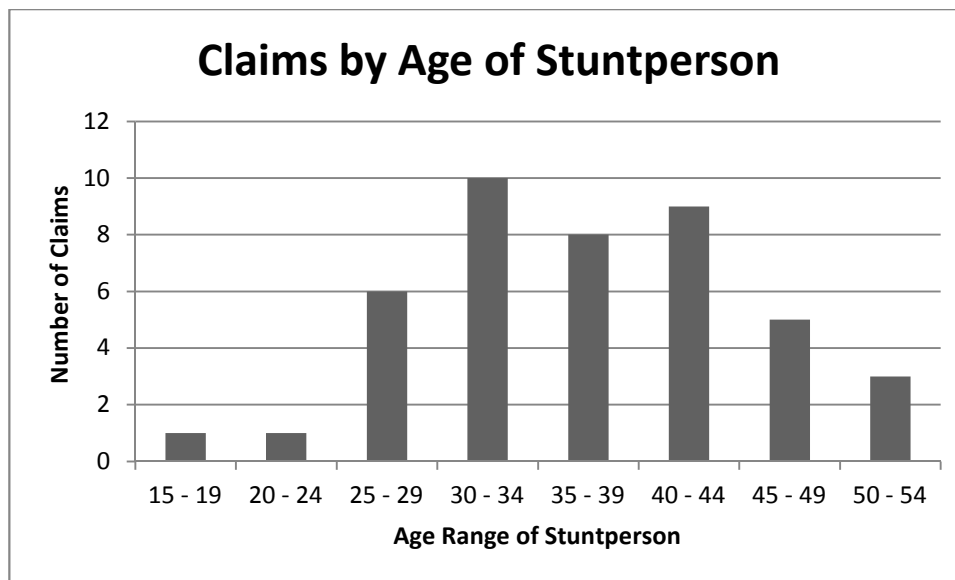
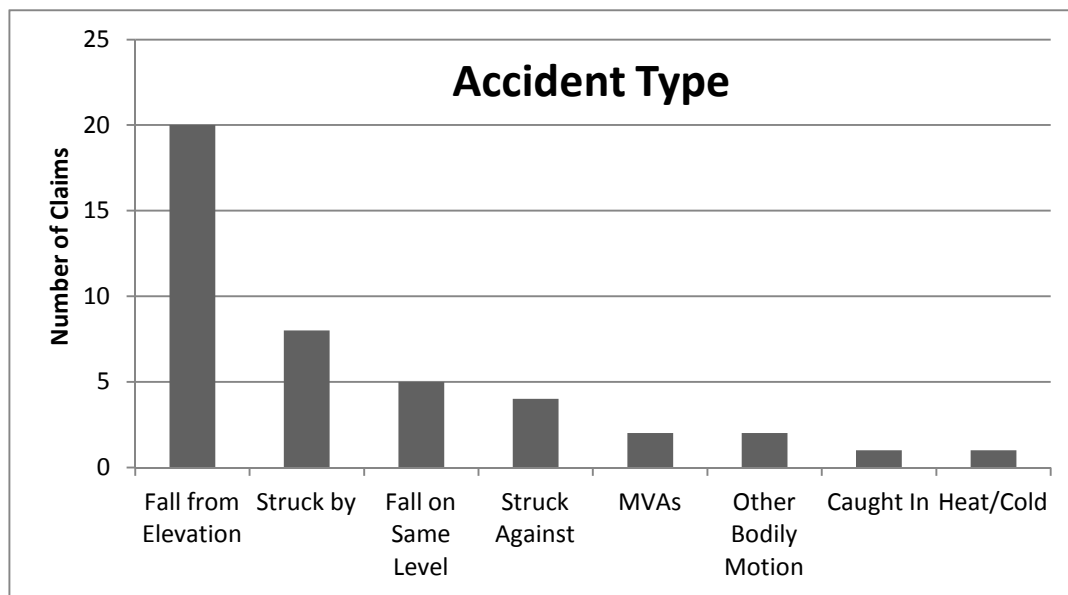


Figure 1. Non-Health Care Only Claims for stunt persons between 2002-2006 (N=43).

The majority of injuries were sustained by individuals between the ages of 25-49. Of the 43 claims, 39 were men while 4 were women. This may reflect the age and gender distribution in the workforce, as the average age of stunt persons in the McMichael's (2007) study was 37, and the individuals were predominately male. Established stunt persons under 25 years of age in the

industry may be scarce due to the importance of experience and connections in ascertaining work. However, since information on the number and gender of all stunt persons within each range in British Columbia is not available, conclusions cannot be definitively drawn about risk of injury by age or gender from this data.

Falls, either from elevation or on the same level, caused the greatest number of injuries (N= 25), accounting for over half of the total claims (Figure 2).



**Figure 2. Number of Claims by Accident Type for Stunt persons between 2002-2006 (N=43). MVA indicates Motor Vehicle Accident**

Inherent in many stunt persons work is deliberate and planned falls, in which use of a fall restraint or arrest system is not practicable in order to achieve a desired visual effect. WorkSafe BC recognizes the occupations unique requirements and provides guidelines specific to stunt work in section G11.2-6. However, as evidenced by this data, fall work is a high risk activity in which safety measures appear to have room for improvement. Of greatest concern should be the improvement of fall protection systems used during falls from elevation. The remaining incidents 'struck by' or 'struck against' objects accounted for the next greatest number of injuries (N=12).

Interestingly statistics on the nature of injury indicated only two stunt persons suffered concussions during the 2002-2006 period. From the results of the McMichael's (2007), to be discussed below, this is fewer than may be expected. Non-reporting of such injuries may explain this discrepancy. Fractures and other strains accounted for the majority of injury types (N=31).

### Academic Sources

The academic literature regarding stunt-related injuries is sparse. A single study was located, addressing the effects of concussions in stunt performers (McMichael 2007). A self selected sample of stunt performers (N= 55) fully completed an online assignment consisting of psychological

assessment tools (McMichael 2007). The major relevant findings included:

1. Increase in the number of reported concussions was associated with a significant decrease in performance on simple reaction time tests in stunt performers.
2. Increase in age of stunt performers was associated with a greater accrual of significant cognitive deficits (verbal and visual memory).

An additional aspect of the study included a questionnaire of the stunt professionals on the acceptance of recommendations from others to stop performing after a concussion (Table 1).

**Table 1.** Self reported response after incurring concussions (N=82). Accepted advice indicates whose recommendation to stop work was adhered to (adapted from McMichael 2007)

Parties Involved	Accepted Advice (%)
Stunt Coordinator	12.2
Paramedic	4.1
Craft Service	1.4
Other Stunt Performers	1.4
1 <sup>st</sup> Assistant Director	1.4
Doctor	12.2
Self-decisions	31.1
Did not stop after injury	36.5

Over one third (36.5%) of performers indicated they did not stop performing immediately after a concussion, while 31.1% made an autonomous decision to stop performing. Stunt coordinators or physicians were found to be the individuals whose advice was most likely to be adhered to. While this data is specific to concussions, the influence of these individuals on stunt performers may be generalizable to communicating other work related injury and illness risk.

The study concluded that stunt performers in the film and television industry routinely perform stunts with a high risk of neurotrauma. Throughout a career, stunt performers are likely to suffer a number of work related injuries due to time constraints, extreme physical demands and the inability to wear bulky protective equipment (McMichael 2007).

Additional studies by Hilary et al (2002) and Covassin et al (2003, 2007) found that females were more susceptible to the effects of concussions. This indicates female stunt performers may be physiologically more susceptible to repercussions from brain injuries than male stunt performers.

## Media

A number of high profile stunt lawsuits have been filed against film studios in recent years for films including Transformers (extra paralyzed on right side), Mission Impossible 3 (stuntperson suffered burns), and Hangover Part 2 (stuntperson suffers major brain injury). These may contribute to increased public and industry awareness surrounding the elevated serious injury risks associated with stunt work.

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## Stunt Training Programs and Safety Guidelines

Training workshops are available for stunt performers in Vancouver through a number of groups. The Professional Stunt Training Center (West Vancouver) provides a focus on fire, high fall, car, air ram and motorcycle stunts. ACT Vancouver (New Westminster) provides a stunt work intensive workshop on scene-study, script analysis, personalization, and auditioning. Various other stunt training groups and classes are available internationally, including the United Stuntmen Association providing “wire-work” training in advanced ratchet, rappelling, air ram, and high falls with deceleration. While classes and training are available, no overarching certification for stunt professionals in North America currently exists.

Stunt safety guidelines specific to stunt elements such as driving, fire, wire-work etc., were not located, but general stunt safety guidelines from McCann (1988) are presented in Appendix 3.

## Conclusions

- Availability of statistics on the number of people that have been injured performing stunts, or in the vicinity of stunts is limited.
- During filming of stunt scenes, individuals in the vicinity of the stunt and not just the stunt person(s), may be at an elevated risk of injury.
- Risk of stunt related injuries appears greatest during actual filming and while on location.
- Falls from elevation were the greatest cause of injury to stunt persons in BC during the 2002-2006 time period.
- Concussions suffered by stunt performers may decrease reaction times and increasing stunt performer age may be associated with deficits in verbal/visual memory.
- Stunt coordinators and physicians were found to be the individuals most influential in communicating health and safety oriented information.
- Causes of stunt related fatalities and accidents include the demand for realism, strict time constraints and increasingly more dangerous stunts.

## Acknowledgements

I would like to acknowledge the guidance provided by Dawn Brennan of Actsafe.

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## **Appendix 1: Literature Search Strategy**

Three bibliographic databases were used to identify the literature for this review: PubMed, Web of Science and CCINFOWeb. The search was conducted in January 2012 and utilized combinations of the following keywords: *stunt\**, *injury*, *training*, *stuntperson\**, *safety*, *wire-work* and *stunt related injuries*. Non-academic sources were identified by entering keyword combinations in the internet search engine Google. Literature in languages other than English was excluded.

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**Appendix 2: Stunt and Special Effects Fatalities in the U.S. between 1980-1988 (McCann 1991):**

- 1980 Rodney Mitchell (cameraman)  
TV Series: "Dukes of Hazzard". Cause: car chase
- 1980 Robert Van Der Kar (cameraman)  
TV Series: "Magnum PI". Cause: helicopter accident
- 1981 Jack Tyre (stuntman)  
Film: "Sword and the Sorcerer". Cause: falling off cliff stunt.
- 1981 Boris Sagol (director)  
TV Film: "World War III". Cause: helicopter accident
- 1982 Jack Tandberg (cameraman)  
TV Film: "The Five of Me". Cause: car chase
- 1982 Vic Morrow, Myca Dinh Lee, Renee Chen (actors)  
Film: "The Twilight Zone". Cause: helicopter accident.
- 1984 Jon-Eric Hexum (actor)  
TV Series: "Cover Up". Cause: blank ammunition accident
- 1985 Art Scholl (stunt pilot)  
Film: "Top Gun". Cause: airplane accident
- 1985 Reid Rondell (stuntman)  
TV Series: "Airwolf" Cause: helicopter accident
- 1985 Claudio Cassinelli (actress), Don Nasca (pilot)  
Film: "Hands of Stone". Cause: helicopter accident
- 1985 Rich Holley (pilot)  
Film: "Runaway Train". Cause: helicopter accident
- 1986 Dar Robinson (stuntman)  
Film: "Million Dollar Mystery". Cause: motorcycle stunt
- 1986 Bruce Ingram (cameraman)  
Film: "The Wraith". Cause: car chase
- 1987 Victor Magnotta (stuntman)  
Film: "Skip Tracer". Cause: car stunt



**Appendix 3: General Stunt Safety Guidelines (adapted from McCann 1988):**

1. There should be adequate access to emergency medical care, fire protection, etc.
2. Safety procedures should be in writing and discussed with all involved, including crew, in advance of stunts being performed.
3. Before hiring, all actors and extras should be aware that a stunt sequence will be performed by trained professionals.
4. All stunts should be rehearsed in a “dry run” without the risks.
5. Only the essential personnel should be in the area where the stunt is being performed.
6. Children should not be permitted to perform stunts or be in the area where the stunt is being performed.
7. There should be the absolute minimum number of repetitions of the stunt to avoid tiring the stunt performer