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## **Technical Report**

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# **PEDESTRIAN CRASH TEST DUMMY PROJECT**

Prepared by:

**RCMP "E" Division  
Collision Reconstruction Program  
and  
University of British Columbia  
Department of Mechanical Engineering**

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**Pedestrian Crash Test Dummy Project**  
**“E” Division Collision Reconstruction Program**  
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The Collision Reconstruction Program in “E” Division developed in 1994, a Pedestrian/Bicycle Collision Reconstruction training program. This training program is five days in duration and since its implementation, has involved the impact of dummies to provide hands on instruction to candidates in the identification of physical evidence and the dynamics of Pedestrian/Bicycle involved collisions. The dummies utilized were and are still constructed from 2 ½” fire hose and are constructed to the specifications of a human body. The weights and dimensions are replicated as close a possible. These dummies served the purpose extremely well and survived multiple high speed impacts.

The difficulty with these dummies however is there was no way of looking at injury patterns or the impact forces.

The Reconstruction Program in “E” Division has had a very close working relationship with the Civil and Mechanical Engineering faculty at UBC since the late 1970's. Discussions with the faculty heads on the construction of a crash test dummy were held and as a result, a proposal was forwarded to the Mechanical Engineering Department. This proposal was added to a list of projects that could be selected by the graduate students. This project was picked and over a two year period, design and construction took place. Numerous meetings were held during the design stages to ensure the specifications were sufficient to meet our needs. The design phase was handled by one group while the construction phase was taken on by the following years group due to graduation of the original team.

The construction took place over a one year period with several meetings to view progress and discuss issues such as skeleton design and outer skin material and the placement of data packs to measure impact forces.

This dummy was designed to fail at critical points which would provide us with indications of the probable injuries that would be experienced by a human being.

The construction was completed in the summer of 2004. In July of that year, the first set of impact experiments took place at the Pacific Region Training Centre facility. The impact was with a Dodge pickup at forty kilometres per hour.

The entire experiment was photo and video documented with both normal and high speed video. The high speed video was capturing at five hundred frames per second.

The initial experiments revealed some flaws in the design. The failure points built into the system worked as they should however some of the joint systems failed due to lack of strength. This was particularly evident at the hips, knees and shoulders. As a result of the initial experiments it was determined each of the weak points required the installation of some type of ligament to provide stability and strength to prevent failure.

This project is ongoing and the upgrades to the joints will be undertaken over the next year and further impact tests will be conducted.

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