C3 Fundamental Research on Evaluation of Impact Load by Hit

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After attending this presentation, attendees will understand the suitable measuring method of the impact loads of a hit.

This presentation will impact the forensic community an/or humanity by demonstrating the importance of considering an assault incident dynamically.

Recently, many incidents in which a human body receives a hit with a bat etc. have occurred. Therefore, at the court, the scientific data of the hit force produced with a weapon is needed. However, hit force has many parameters, such as average value, maximum, and action time, and is difficult to quantify. Then, the hit experiments were conducted using metal baseball bats, wooden swords, and aluminum pipes. During the experiments, impact load was measured by load cells, and hit speed was measured from high-speed video images.

This research considered the evaluation method of impact load using the maximum of impact load, impact energy, and hit speed. Moreover, the authors also investigated the influence of soft tissues, such as skin, on the damage that human bodies receive.

As a result, the authors were able to acquire the following knowledge.

(1) The maximum of impact load is proportional to hit speed.
(2) Even with different hit methods, if hit speed is the same, the impact load that a human body receives is comparable.
(3) The quality of the material and thickness of soft tissue, such as the skin, affect both the size and action time of impact load.
(4) There is a close resemblance between the kinetic property over the impact load of commercial cell sponge, and that of soft tissue.
(5) By putting in cell sponge between a load cell and a hitting instrument, a load equivalent to the impact load, which an
actual human body receives, is measurable.

Impact Load, Hit Force, Cell Sponge

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