HEADS UP

The Newsletter of the Snell Memorial Foundation, Inc.

This is the sixty-seventh of the Foundation's newsletters to the helmet manufacturing industry. The sixty-sixth went out in March. Comments and items for inclusion in subsequent issues are invited.

Workshop on Angular Head Motion

A summary of the IRCOBI-NOCSAE-PDB-Snell Workshop titled "Angular Head Motions: their importance and measurement." has been posted on the Snell website. THE STATE OF BIOMECHANICS OF ANGULAR HEAD MOTIONS 2015 includes a link to the workshop's presentations.

This workshop took place last September 8th in Lyon, France in conjunction with the annual IRCOBI conference.

Snell Manufacturers Meeting

There are no plans, as yet for the next Snell Manufacturer Meeting. Previous meetings have been held in conjunction with motorcycle industry shows such as the Powersports Expo or the AIMExpo but attendance at these shows and the Snell meeting in recent years has been disappointing. Are these meetings necessary at all? Your suggestions and advice will be gratefully received.

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Standardized Helmet Shell Label

In order to resolve some of the model name confusion between Snell and non-Snell certified motorcycle helmets, we are considering a standard label block for helmet shells which would identify Snell certified units for consumers. This label would replace or supplement the existing claims for Snell certification seen on many current Snell certified motorcycle helmets.

The shells of most all Snell certified motorcycle helmets already have similar labels but a more uniform format might prevent a lot of uncertainty. We'd expect to allow range of options for details such as placement, and colors. The whole point is to be able to tell helmet buyers that if it has one of these on the shell, the helmet is surely Snell certified and there's a Snell certification label somewhere inside. The following image is one possibility but we look to the industry for suggestions.

Impact Test Criteria

Issue #66 of Snell Heads Up included a discussion of impact test criteria. It explained some of the

consequences of shifting Snell testing to variable mass head forms which, like human heads, become heavier as their size increases. Some current consensus standards ignore these consequences and allow significantly higher levels of shock to be transmitted to individuals with larger sized heads. A copy of Issue #66 including this discussion is available for review on the Snell website.

EA2016 - for Elite Auto Racing

Snell's directors have voted to proceed with a program for auto racing helmets incorporating advanced shell technology. Such helmets have been available since the start of the FIA 8860 program in 2004. Snell's EA2016 program draws on the FIA experience but brings it forward to incorporate current practices and criteria and also streamlines the testing by cutting away redundant and non-productive procedures.

The technology on which EA2016 depends is costly; the helmets are likely, at first, to be more expensive than most drivers and teams might reasonably afford. However, it is hoped that in time new efficiencies and growing volume might bring costs down to levels appropriate for most amateur racing as well as, we hope, for street motorcycle use.

E2016 for Horseback Riding

Snell is also revising its E2001 equestrian helmet program. E2016 is based on E2001 but incorporates current procedures and criteria. Helmets meeting E2016 are expected to look and weigh much the same as comparable E2001 headgear. They will be the most protective headgear current horseback riders might reasonably be expected to wear.

CM2016 for Children's Motor Sports

Snell and FIA will proceed with a revised CM2016 program for children's motor sports helmets. The CM2016 standard is almost identical to the CM2007 requirements. Testing services for CM2016 may also be sought at Newton Laboratories in Milan, Italy.

Testing Workaround

Achieving success in Snell programs almost certainly obliges helmet makers to develop a reliable in-house test facility. One of the frequently encountered problems is drop height. To get the proper impact velocities for some Snell standards might call for upwards of four meters or fifteen feet from floor to ceiling. However, it may be possible to perform a reasonably valid test with shorter drops by increasing the mass of the head form and drop carriage and then scaling the target impact velocity and impact response accordingly.

A few drops at or near the greatest drop height available will yield a reasonable value for the working impact velocity, V_0. The necessary drop mass is then:

$$M_T \geq M_S\left(V_S/V_0\right)^2$$

With the drop mass set to M_T, set the drop velocity for the tests to:

$$V_T = V_S\sqrt{M_S/M_T}$$

Now the resulting G response should be scaled upward and the time axis reduced according to:

$$G_S = G_T\left(M_T/M_S\right) \text{ and } t_S = t_T\sqrt{M_S/M_T}$$

Where the S subscript represents values that might be expected of tests to the standard and the T subscripts those values actually used or observed.

The general effect is that the greater drop mass reduces the G values and extends the time durations. If the helmet's material properties are not significantly velocity sensitive, the scale factors will undo these effects yielding results reasonably approximating those which might be obtained here.

A more complete treatment of this subject will be posted on the Snell website soon. In the meantime, we will be grateful for questions, comments and advice.

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