Issue 68 **December 15, 2016**

HEADS UP

The Newsletter of the Snell Memorial Foundation, Inc.

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

Snell Manufacturers Meeting

There was no Snell Manufacturers Meeting in 2016. Previous meetings had 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 had been disappointing. Are these meetings necessary at all? Your suggestions and advice will be gratefully received.

In lieue of a 2016 meeting, a presentation was prepared and sent out to the industry and other interested parties for review. Your comments regarding the plans and proposals discussed in this presentation will be gratefully received.

EA2016 - for Elite Auto Racing

We are pleased to announce that the BSR model BF1-900 in sizes L and XL has been certified to Snell's new EA2016 standard. This is the first headgear to meet EA2016 requirements here in the laboratory.

The technology on which EA2016 depends is costly but it allows a substantial increase in protective capability beyond that demanded in Snell's current SA2015 standard. It is hoped that in time new efficiencies and growing volumes might soon make this increased protection available to all classes of auto racing.

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 a range of options for details such as placement, size 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

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and there's a Snell certification label somewhere inside. The image shown is one possibility but we look to the industry for suggestions.

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 September 8, 2015, in Lyon, France in conjunction with the annual IRCOBI conference.

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:

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

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 has been posted on the Snell website. We will be grateful for questions, comments and advice.

SSREC

The Snell Safety Research and Education Center is now in operation. It is organized under 501 c3 rules and is eligible to receive tax deductible donations. SSREC replaces the Snell Safety Education Center and is dedicated to fostering research into brain injury mechanisms as well as educating the public in the proper selection and use of crash helmets. Ms. Zhang is the president of SSREC and welcomes questions, comments and donations.

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