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The Quarterly Newsletter of the Snell Memorial Foundation

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This is the fortieth of the Foundation's newsletters to the helmet manufacturing industry. The thirty-ninth was sent out in July. Comments and items for inclusion in subsequent issues are invited.

**M2005 & SA/K2005 Standards**

Advance testing to M2005 and SA/K-2005 Standards has been proceeding. Quite a few models have already met Snell 2005 certification test requirements. Until the 2005 standards take effect, many of these models will be distributed and sold with M2000, SA2000 or K-98 certification labels.

M2005, SA2005 and K2005 labeled helmets will

not be made available to the public until October, 2005. However, this is not necessarily a reason to delay helmet purchases. The Snell 2005 standards represent only an increment of improvement on existing requirements. Many Snell M2000, SA2000 and K-98 headgear already meet them. If you need a helmet now, don't put off the purchase until next October. A well fitting, comfortable and good looking Snell 2000 helmet will not turn into a pumpkin at midnight, September 30, 2005. You will not have to run out immediately to buy another. By the same token, if you need a helmet late next fall and while you're looking over the Snell 2005's, you happen to find a new Snell 2000 configuration that fits well and comfortably and looks good on you, well hey, you can stop looking right there.

If you're looking for a Snell certified helmet for use in organized competition, however, please consult the rule books and, maybe, the officials before making a purchase. We recommend that these organizations allow helmets certified to the appropriate, current or immediately previous Snell standard but this is purely a recommendation. Racing organizations set their own policies for helmets.

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## Invalidated Snell Certification

Snell certification refers to the helmet as it leaves the factory. We test representative helmet samples before a model is allowed into the program and on a continuing basis afterwards. If these samples do well, we can be reasonably confident that their identical siblings rolling off the assembly line will do well in the field protecting real live people in real world crashes. However, once these identical helmets are purchased and put into service, they begin to become unlike. Whether it's merely through wear and tear or by deliberate modification, every Snell certified helmet over time becomes a unique entity unlike any other in the world and certainly unlike the samples we test here in our laboratory.

At some point in this transition, the Foundation can no longer continue to recommend the helmet for use. The unit may still be highly protective but our basis for thinking so will have evaporated. For this reason, once a helmet has been put into service, the Snell sticker by itself is not sufficient to establish reasonable protective capability. Someone must perform a field evaluation; that is: examine the helmet and, possibly, consider its history and then make a determination whether the unit is still appropriate for use.

Currently, there's no good way to eyeball a helmet for protective capability. Instead, we look at a helmet's certification and base our faith on the protective performance of identical units. But to justify that faith, we must then eyeball that helmet to eliminate any reason for doubt. It is not sufficient that a helmet merely be able to protect. If it is to be useful at all, the owner and everyone else with an interest must have faith in that helmet's capability and have a reasonable basis for that faith.

## Field Evaluations

Since certification applies to the "as manufactured" condition, every helmet should be examined and considered each time it is worn. This process cannot establish protective capability but it

might be a basis for continued faith in an earlier finding.

## Helmet Age

The Foundation recommends protective headgear be routinely replaced five years or sooner after the date of its first use. If the manufacturer urges even a shorter period, the Foundation will defer to that judgement. This advice presumes reasonable care and an unremarkable history. If the helmet has been abused, modified or crashed, one or more of the following sections may apply instead.

## Helmet Modification

Aftermarket helmet modifications are a complex issue. The Foundation's directors do not want to forbid them but have no way to check and assess the efforts going on in small shops and garages all over the world. We cannot claim to know, with any reasonable confidence, whether a helmet with aftermarket modifications will still pass Snell performance tests.

In judging a helmet modification, consider the following items:

1. Is the modification worthwhile?
2. Has it been performed competently?
3. Have the changes to the shell been kept to a reasonable minimum with
  - a. no effect on stiffness?
  - b. minimal internal and external projections?
4. And with no perceptible change to the impact managing liner?

Most modifications will likely include slight changes to the helmet shell but must not affect shell stiffness. If the shell seems more flexible because of the change, the impact management has likely been compromised.

Shell modifications may also include internal and external projections. For motorcycle headgear or any application in which the wearer might reasonably be ejected from the vehicle, external projections must be smoothly faired to slip easily

over any surface with which the helmet might come in contact or the projection must break away under moderate loads. Sharp internal projections of more than a few millimeters, even those under the impact liner, should not be allowed. Pop rivets are especially troublesome.

**M**odifications to the impact managing liner, particularly the removal or flattening of sections of it should never be allowed. This liner is the true workhorse of the helmet's impact protective system. Any change to it should be expected to reduce the helmet's ability to withstand impact.

**C**ommunications gear: wiring, microphones and small speakers, are frequently built into the chin bar and/or lower edges of helmets. These changes are well below our impact test areas but, even so, the concerns for internal and external projections remain and the chin bar should not distort significantly under a fore and aft loading.

### **Helmet Damage**

**A**ssessing impact damage is much more difficult. Cosmetic chips and dings start to appear on many helmets almost as soon as they're taken out of the box but need not suggest degradation of protective capability. However, broad areas of deep parallel scratches and any broadly distributed pattern of cracks suggests some sort of head impact. If a Snell certified helmet has involved in head impact, it should be retired and replaced.

**S**ometimes, the impact managing liner of a crashed helmet will feel spongy to the touch. Particularly if it is made of expanded polystyrene (EPS). When the helmet shell strikes an impact surface, it stops moving immediately but the head inside the helmet remains in motion crushing the liner between itself and the inner surface of the helmet shell. As it is crushed, the liner applies controlled braking forces to the head slowing it to a relatively gentle stop. But it takes permanent damage doing so. This damage may be detectable. If an EPS liner feels spongy in some areas and firm in others, the liner has likely been

compromised, the helmet should be retired and replaced.

**U**nfortunately, many helmets will not be visibly affected by impact. Some helmet shells will flex considerably without cracking or splitting. The crush damage to an EPS liner may be at the outer surface, just under the shell so that the inner surface remains deceptively firm. If the helmet was truly impacted, its capabilities have almost certainly been compromised and it should be replaced. Who ever was wearing it knows but there may be no practical way for anyone else to determine its condition conclusively.

### **Mishaps**

**I**f an empty helmet is dropped a few feet from a table top or the back of a bike onto a hard floor or pavement, the impact management is likely unaffected. The shell may be marred, even chipped but, in our experience, there would be no detectable effect in test results. Unless the manufacturer advises otherwise, one such simple fall is no reason to mistrust a helmet. Even so, such mishaps are to be avoided. Helmet damage is cumulative. A history of clumsy handling will destroy a crash helmet eventually.

**D**eliberate abuse is another matter. Crash helmets are inherently fragile, they protect by taking damage. An intemperate act may render a helmet useless. Anyone who abuses a helmet should be responsible to replace it.

### **Scrutineers**

**H**elmets used in competition are usually subject to safety inspections by official scrutineers working for the track, the organizer or the racing association. These scrutineers may only have a few seconds to consider a helmet. In that short period, they are likely to consider only the helmet and brush off any explanations or extenuations provided by its owner as so much moonshine.

The policy is reasonable, even the most sensible helmet owner may have his judgement swayed by sentiment for a lucky headgear or by the price tag on a new one. If the scrutineer won't accept your current helmet, the Foundation will not question his ruling and you shouldn't either. Retire the helmet and replace it.

### Production and Distribution Reports

Random Sample Testing (RST) is an essential part of the Snell certification program. This checks the manufacturer's quality control and assures the consumer that the same quality of head protection that we saw in certification process will be found in follow-on production. Riders can buy with confidence because they know our RST program gets and tests helmets from the same stores they use. Your company's quarterly report on production and distribution of Snell products are required by the Snell licensing agreement. This information helps us make timely decisions to conduct RST on specific models and quantities. Hong Zhang will be contacting your company to submit these reports every three months.

### Cloth Certification Labels

The Foundation does not plan to provide cloth labels for the M2005 and SA2005 programs. These labels had been provided in the past as an alternative to the commonly used adhesive certification labels. The cloth labels were intended to be sewn to the helmet comfort liner or to the chin strap. However, there has been no demand for them in the past few years.

### HANS® Attachments Testing

There has been considerable interest in head/neck motion limiting devices in recent years. The Foundation's directors have been watching these developments but feel that the Foundation, as yet, has no reliable basis for establishing a program or for making recommendations to consumers. However, since quite a few helmets submitted for SA type certification are equipped with hardware for attaching HANS® system tethers and since there is

an existing test protocol, FIA Standard 8858-2002, the Foundation's directors are considering whether to offer that test as a service to helmet manufacturers and to the auto racing community.

The Foundation already makes judgements concerning whether tether attachment hardware interferes with the traditional protective functions of auto racing helmets. We propose to provide an additional service to evaluate HANS® equipped headgear according to existing standards.

This service will only be offered for manufacturer installed systems. The directors realize that many of the current systems have been installed by aftermarket modifiers and quite often by the helmet buyer himself. However, there is no reasonable way in which the Foundation could evaluate them. If a manufacturer builds 10,000 HANS® equipped helmets, we might reasonably test a few of them and claim to know something about the rest. But if 10,000 individuals do their own installations, we'd have to look at all 10,000. Since our tests are destructive, there wouldn't be much point.

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