‘How safe is your lid?’

SHARP have been helping answer that question since 2007. We look inside their labs to discover how they plan to push safety to the next level

By Emma Franklin
DEPUTY EDITOR

For the past 17 years, SHARP stars have been a guiding light for motorcyclists looking to buy a new helmet. By subjecting lids to a series of tests more stringent than the minimum regulatory standards then rating them between one and five, the government-funded scheme has been providing unique insight into the relative protective performance of full-face and modular helmets, allowing us to get the best protection whatever our budget – regardless of whether that’s £100 or £800.

Plenty has changed since SHARP’s inception in 2007, including the helmet regulations themselves, which is why MCN made an exclusive pilgrimage to the SHARP testing facility at TRL (formerly the Transport Research Laboratory) in Berkshire to find out the impact of the scheme so far, and how it’s about to help to push helmet safety even further in 2025.

Launched to save lives

SHARP was launched in 2007 by the Department for Transport (DfT) in response to a Europe-wide study into 7071 motorcycle accidents and their resultant injuries. The research found that there was a huge variation in the safety performance of motorcycle helmets – by as much as 70% – and concluded that 47 bikers’ lives per year could be saved if all had worn the best-performing lid. The DfT decided that riders should be informed about these differences, along with the importance of correct fit, to help us choose our next helmet.

For the past 17 years, that’s exactly what SHARP have done, subjecting more than 500 different helmet models to a series of additional safety tests that exceeded those required by the UN Regulation No 22 for helmets. SHARP then score each lid’s performance based on its ability to reduce the risk of rider fatality, from one star (lowest) to five stars (highest) and publish the results on their website. During the early years, some of the initial findings were exceptionally eye-opening.

“Back when we started testing in 2008 through 2009, there were some pretty well-known helmet manufacturers that were performing really poorly,” says Dr Phil Martin, Head of Transport Safety at TRL, and a specialist in head injury biomechanics.

“Those manufacturers were scoring two or three stars back then, whereas now all their lids are scoring four or five stars.”

Looking back through SHARP’s historical ratings online, an example of this is the range-topping Arai RX7 Corsair from the mid 2000s which scored three stars; the RX7 GP from towards the end of that decade scored four stars; then the RX-7V introduced in 2014 scores the maximum five stars. Three evolutions of helmet all subjected to the same SHARP tests over a period of six years.

It’s a pleasing trend that Dr Martin says could be thanks in part to the work of SHARP. “Helmet safety has improved over time. If you look at the 2008/2009 SHARP rating scores compared to 2020/21 [see graph], you can see the progression, you barely find any one-star helmets now. It may not be necessarily that manufacturers are trying to ‘pass SHARP’ it’s perhaps just that SHARP initiated increased awareness for manufacturers, allowing them to see areas where their designs that were not giving full protection. Some of those quick wins happened in helmet models that came out in 2009-2013 when manufacturers made these step-changes in their designs – such as more energy-absorbing shells, the benefit of which was another finding from SHARP testing – and ultimately that results in a shift in terms of safety performance.”

Interestingly, the period around 2009 where SHARP say manufacturers made these ‘step-changes’ correlates with a fall in the rate of motorcyclists killed or seriously injured on the road. “When you look at data from 2005 to 2022 for the rate of motorcycle

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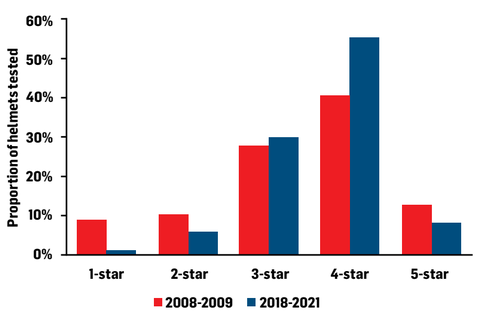

GET THE BEST PROTECTION

The latest SHARP ratings

The scheme is set to test on average 30 helmets every year, and the team would like your input as to which models you'd like them to test next. Drop them message at www.sharp.dft.gov.uk/request-helmet-test. In the meantime, here are the latest lids to go through the SHARP lab...

Shoei Neotec 3 from £589

SHARP rating ★★★★★
Premium Japanese dual-homologated flip-front is also certified to the latest ECE 22.06 standard. It features a drop-down sun visor, a micrometric buckle, and provision for an intercom. It scored the maximum of five stars, and the chin bar remained closed for 93% of impacts. **www.shoei-europe.com**

Ruroc Atlas 4.0 Carbon from £375

SHARP rating ★★★★½
This is the first Ruroc 22.06 helmet to be tested by SHARP, after the team reported over 80 public requests for them to test the latest offering from the British brand. The carbon-shelled, full-face lid features a Fidlock chin strap. The Atlas 4.0 scored four out of five stars. **www.ruroc.com**

Shoei NXR2 from £429.99

SHARP rating ★★★★★
Full-face composite-shell sports-touring lid from the premium Japanese brand. It was Shoei's first ECE 22.06-compliant helmet when it was launched in 2022, and only the second helmet on the market to meet the new standard. Lightweight and featuring multi-density EPS, it scores the maximum five stars. **www.shoei-europe.com**

Nolan N90-3 from £215.99

SHARP rating ★★★★½
Modular thermoplastic-shelled lid in an adventure-sports style, the Nolan features a drop-down sun visor as well as advanced ventilation and a micrometric chin strap. Launched in 2020, it meets the older ECE 22.05 standard but achieves four stars. The chin bar remained closed in 90% of SHARP's tests. **www.nolan-helmets.com**

You need to know if that chin bar is going to stay closed in a crash

KSIs (which is the number of riders killed or seriously injured per billion kilometres ridden), you see quite a steep drop off between 2005 and 2010, but since 2010 the rate has plateaued," says Dr Martin.

"How much of that was down to helmet design alone is difficult to pick out, as there were other improvements to road safety during that time, such as better barrier designs as well as increased awareness of motorcyclist vulnerability, but SHARP has influenced the KSI rate, no doubt."

Another enlightening result of the SHARP scheme is the proof that the old biker adage of 'if you've got a £100 head, buy a £100 helmet' isn't true, as their tests prove there is no correlation between price and protection. HJC's entry-level polycarbonate-shelled full-face C70, currently available for £99.99, has been awarded a maximum five stars by SHARP, the same rating as AGV's former range-topper, the carbon fibre £1000 Pista GP R.

"It's the most common myth that we like to debunk when we attend bike shows," says SHARP Technical Lead and Suzuki GSR750 rider, Ross Clark-Raee – the man who oversees all of SHARP's impact tests at TRL.

"So many people fall into the trap of thinking that you have to spend more to get more protection, but the price just dictates the features... and perhaps whether it's got a MotoGP rider's design on it!"

Testing beyond the standard

SHARP's remit is to test at impact speeds below and beyond the required standard set out by the regulations to show motorcyclists the differences in safety performance between helmet models. The current SHARP test protocol published in 2007 uses the same impact test methods as ECE 22.05 (linear against a flat and kerb anvil, and also a 15° surface abrasion oblique strike) but also tests at a 30% higher, as well as lower, impact speeds for the linear tests – up to 8.5m/s, whilst still requiring that no more than 275g of force be transferred through the helmet to the headform (a dummy head equipped with accelerometers).

The tests are conducted using seven examples of one helmet model, all purchased by SHARP from retailers in the same way you or I would buy. Using one helmet per speed (6m/s, 7.5m/s and 8.5m/s) and for each anvil, helmets are impacted at five precisely measured points. The seventh sample is used for the angled impact test also at 8.5m/s. The tests are filmed with a high-speed camera, photographed, and the lids carefully inspected by hand afterwards.

SHARP award their star rating based on the helmet's ability to demonstrate enhanced energy absorption properties above the regulatory standard's impact speeds, using data from real-world accidents to show how the energy absorption reduces fatalities.

SHARP also test modular helmets and assesses the robustness of the chin bar locking mechanism, detailing the frequency at which they open during test impacts as a percentage.

Going beyond ECE 22.06

Since January of this year, all new helmets on the market must meet an improved standard, ECE 22.06 – the first update to the regulation in over 20 years – which puts helmets through much more rigorous tests, similar to those of SHARP. The arrival of this new standard means that SHARP now need to evolve their protocol to continue to rate helmets above the standard, and they're doing this with a project called SHARP 2025, expected to be launched next year.

"SHARP essentially influenced some of the changes in the updated regulation, therefore SHARP 2025 is in response to those changes," Dr Martin tells MCN. "So because 22.06 has increased the rigour of the testing with higher impact speeds and angled anvils, SHARP have to evolve to test beyond that.

"We currently have the surface friction test as part of SHARP but the new 22.06 tests at a 45° anvil, which is good and we will replicate that as we've been advocating for it for donkey's years. It could go further, though, and we're investigating whether we take it beyond 45°.

"Higher impact speeds and different angles relate to different injury populations – riders travelling at different speeds impacting at different energies and crashing in different impact configurations. So if we test at a broader range, you protect a broader population."

As well as the tests themselves, SHARP 2025 will also update the rating system, scoring the helmets on not only the big energy impacts that cause fatalities, but also the medium energy impacts that can cause serious injuries.

"This means there's a greater scope for differentiating between the four and five stars compared to today's rating scheme," says Dr Martin. "We're also looking at ways to fairly test open-face helmets, something which SHARP currently doesn't test." MCN

Sensor-laden headforms replicate the human skull during impact testing

Video is an important component

A helmet ready to drop onto the anvil

'SHARP will evolve to test beyond the rigorous ECE 22.06'

Angles reflect real-world accidents

Meter measures the impact speeds

Tests are evolving to take SHARP further beyond the new ECE 22.06 standard

MAN ON A MISSION...

Ross is fighting the good fight

ROSS CLARK-RAEE

'That helmet saved my life'

Ross Clark-Raee is SHARP's Technical Lead, a role he gravitated to after having his life saved by wearing a SHARP five-star-rated helmet.

"In 2015, I was riding to my job in music management when a van crossed in front of me. I had nowhere to go except into oncoming traffic or into the side of his van. I hit the van.

"When I came to, I found I'd broken both arms, dislocated my thumb, broken all the bones in my left foot and had a couple of other dislocations. It turns out that I'd also broken my back, but because my arms were pointing in the wrong direction, they fixed those first.

"After looking at the state of my lid and speaking to witnesses, the helmet saved my life, no question. The only reason I'd bought that helmet was because it had a SHARP five-star rating and nothing else within my budget had five stars. It was a Marushin RS2 Carbon.

"While I was in the hospital, I started thinking to myself, if I hadn't made it through, would I be satisfied with the mark I'd left on the world? I didn't really feel that doing what I was doing, massaging the egos of musicians, was important in the grand scheme of things... So I started to learn about SHARP – initially just so I could send them a letter to say thanks.

In doing so, I discovered that TRL was instrumental in creating the scheme and weirdly enough, I'd lived local to them for 35 years. So I made it my mission to work for TRL.

"After months of looking, a very junior coordinator role for the impact test facility became open. On my first day I asked where the SHARP testing happened, and I was told that TRL didn't do the actual testing. So I made it my mission to ensure that we did do it here.

"It's not just me, far from it, but I can say that we wouldn't have been doing the testing here at TRL if I wasn't driving them towards doing that. I'm really proud to be doing this work."

Testing has been brought in-house