Beginnings

- Amateur Racer William “Pete” Snell
- Rollover Crash in Arcata, California,
  - August 6, 1956
- Pete died of head injuries
  - Sustained in a then state-of-the-art helmet
Helmet in 1950s
How to Choose among Today’s Motorcycle Helmets?
Snell Motorcycle Helmet Standards

2000 STANDARD FOR PROTECTIVE HEADGEAR

2005 STANDARD FOR PROTECTIVE HEADGEAR

2010 STANDARD FOR PROTECTIVE HEADGEAR

2015 STANDARD FOR PROTECTIVE HEADGEAR

2020 STANDARD FOR PROTECTIVE HEADGEAR

www.smf.org
Effectiveness of Standards

• Standards = Documents

• Effectiveness of standards depend on
  * Strict and independent certification
  * Enforceable compliance
  * Experience and competence

• Testing and More Testing

www.smf.org
Not how Snell tests helmet
Oldest Snell Testing Photo
Old Oscilloscope Early 1960s
Snell Test Lab Today
Snell Impact Test
Snell Penetration Test
Roll-off Test
Snell Face Shield Test
Some fail tests.
Some pass tests.

<table>
<thead>
<tr>
<th>Overall assessment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HELMET PASSED</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact info</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample:</td>
<td>1. Hemi, Right</td>
</tr>
<tr>
<td>Drop No:</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact data observed</th>
<th>(std)</th>
<th>(%error)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Velocity:</td>
<td>8.496</td>
<td></td>
</tr>
</tbody>
</table>
Scientifically Valid & Repeatable Test
Experience and Expertise
Snell Certification Program

- Tough Standard Requirements
  - To ensure best protection available
- Certification
  - To determine Worthy Helmets
- Random Sample Testing
  - To assure compliance of helmets in markets
Snell Certification/RST Testing
Snell - Most Stringent Standard

WARNING

SOME REASONABLY FORESEEABLE IMPACTS MAY EXCEED THIS HELMET’S CAPABILITY TO PROTECT AGAINST SEVERE INJURY OR DEATH.

SAMPLE OF THIS HELMET MODEL HAS PASSED THE SNELL STANDARD AND IS SO CERTIFIED.

www.smf.org
Snell Updates Standards Every 5 Years
M2020 Standard Effective Oct. 1, 2019

www.smf.org
Newer Helmets and Greater Protection

- The effectiveness of helmet has increased from 29% between 1982-1987 to 37% between 1993-2002. (NHTSA reports)

- Tougher Snell Standards

- DOT Standard Unchanged

- Better Designs and Materials

www.smf.org
Shell Spreads the Load.
Liner Foam = More Braking Time
Research Snell vs DOT

Flat Anvil Impact Response - 57-59 cm (ISO J) Sized Helmets

- Peak G (Shock)
  - NO SIGNIFICANT DIFFERENCE
  - SIGNIFICANT DIFFERENCE

- Velocity - Meters per Second

- Snell M2010
- DOT FMVSS 218

www.smf.org
Snell Protects/DOT Bottoms Out

Hemispherical Anvil Impact Response - 57-59 cm (ISO J) Sized Helmets

- Peak G (Shock)
  - 500
  - 400
  - 300
  - 200
  - 100
  - 0

- Velocity - Meters per Second
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
  - 11
  - 12

- NO SIGNIFICANT DIFFERENCE
- SIGNIFICANT DIFFERENCE

- Snell M2010
- DOT FMVSS 218
Fact Check

• Misinformation that Snell helmets are only for racers.

• DOT is NOT all you need.

• Snell helmets are NOT too hard.
  • Snell & DOT protect the same in minor impacts.
  • Snell continues to protect at higher levels long after DOT protection fails.
International Conference of Biomechanics Research (IRCOBI)

- September 2015 in Lyon, France
- Snell Presents Peer Reviewed Research Paper
- Low Energy Impact Comparison Study
- Snell and NOCSAE Sponsor a Seminar on Test Method for Angular Acceleration

www.smf.org
Three Helmet Standards (US)

- **ECE and DOT (FMVSS 218)**
  - Mandatory - minimum impact protection requirement
  - DOT Self-certified /ECE Not as protective
    - Manufacturers arrange “reasonable” testing
    - Claim DOT certification for their own products

- **Snell M2015**
  - Voluntary - premium impact protection capability
  - Snell certified
    - Snell does pre-market and in-market testing
    - Manufacturers are bound by contract

www.smf.org
Impact Energy Management

as a percentage of ECE demands

- ECE
- DOT
- SNELL

Smallest Sizes
- 100%
- 110%
- 210%

Largest Sizes
- 100%
- 120%
- 160%

www.smf.org
Snell Means Premium Protection. DOT and ECE are Minimum Requirement.

<table>
<thead>
<tr>
<th>Impact Energy Management</th>
<th>Medium Size Helmets</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 22.05 (45%)</td>
<td></td>
</tr>
<tr>
<td>DOT (51%)</td>
<td></td>
</tr>
<tr>
<td>SNELL (100%)</td>
<td></td>
</tr>
</tbody>
</table>
Motorcycle Helmet Effectiveness

- NHTSA estimates that helmet usage leads to:
  - 37% reduction of crash fatality
  - 67% prevention of brain injuries
Other Snell Standards
NASCAR & INDY 500
Austin Dillon Walking Away from 2015 Crash NASCAR Daytona Finish
Helmet Fit Research

• Well-fitted helmets protect better.

• Dr. Amy McIntosh reported in 2012 that children with help fitting a helmet had concussions reduced by 41%.
How Helmets Work

• Space
• Time
• Cartoon Videos on YouTube.com

www.smf.org
Bridging Vein Rupture

Snell Foundation, Inc.  www.smf.org
Shell Spreads the Load.
Liner Foam = More Braking Time
Physics in a Thumb Tack
Hard Shell / Spread the Force
Skull Fracture and Hemorrhage
Snell Helmets Save Lives.
Snell Tests For Public Safety

• Snell Web Site Helmet List

• Updates Each Day

• Certified Helmets by Name and Size

• Decertified Helmets Noted

www.smf.org
Snell’s Mission

• Evidence based Helmet Standards
• Premium Protective Helmets
• Injury Prevention Education

www.smf.org
SCCA National Hall of Fame 2015
Helmet Dos and Don’ts

- Replace every 5 years.
- Fasten chin strap.
- Clean with only soap and water.
- Do not cut or alter the helmet liner.
- Do not put helmet near hot muffler or engine.
- Do not place helmet atop mirror or handle bar.
Snell’s Mission

- Evidence Based Helmet Standards
- Premium Protective Helmets
- Injury Prevention Education
We Don’t Make Helmet. We Make helmets Safer.
More Information

- Videos in Snell Youtube Channel
  - How Helmet Works to Protect the Brain
  - Why Helmet Standards Matter
  - Snell Lab Tour

- Snell Facebook/Twitter

- Call Snell Lab and Office: 916-331-5073
Last Words

• Riders have no direct indicators of helmet protective capability
• Riders can look for indirect indicators (e.g.: a serialized Snell sticker)
• There are reasonably foreseeable crashes that will exceed a helmet’s protective capabilities.
• In serious crashes riders need all the impact management capability a helmet can offer.
• www.smf.org 916-331-5073 for more info