

THOR 5th Percentile Female

Advancing Safety for Small Female Occupants

Background

- Safety for all occupants in motor vehicle crashes is a top priority for NHTSA.
- Field data indicates that male and female occupants have different injury risks.
- Historically, frontal crash testing has relied on the Hybrid III 5th percentile female dummy, which was developed over 35 years ago primarily using scaled male data, to protect small female occupants. The THOR 5th was designed using a much greater percentage of female data.



Goal

- Apply in frontal crash tests as an advancement over the current Hybrid III 5th
- 3x as many sensors
 - Shape, size, and response in a crash is based on female bodies

Assessments

Biofidelity:

THOR 5th is an acceptable representation of a small female occupant.

- Quantified using BioRank Score (BRS)
- Smaller BRS = more biofidelic response



Durability:

THOR 5th is suitable for use in severe crash test scenarios.

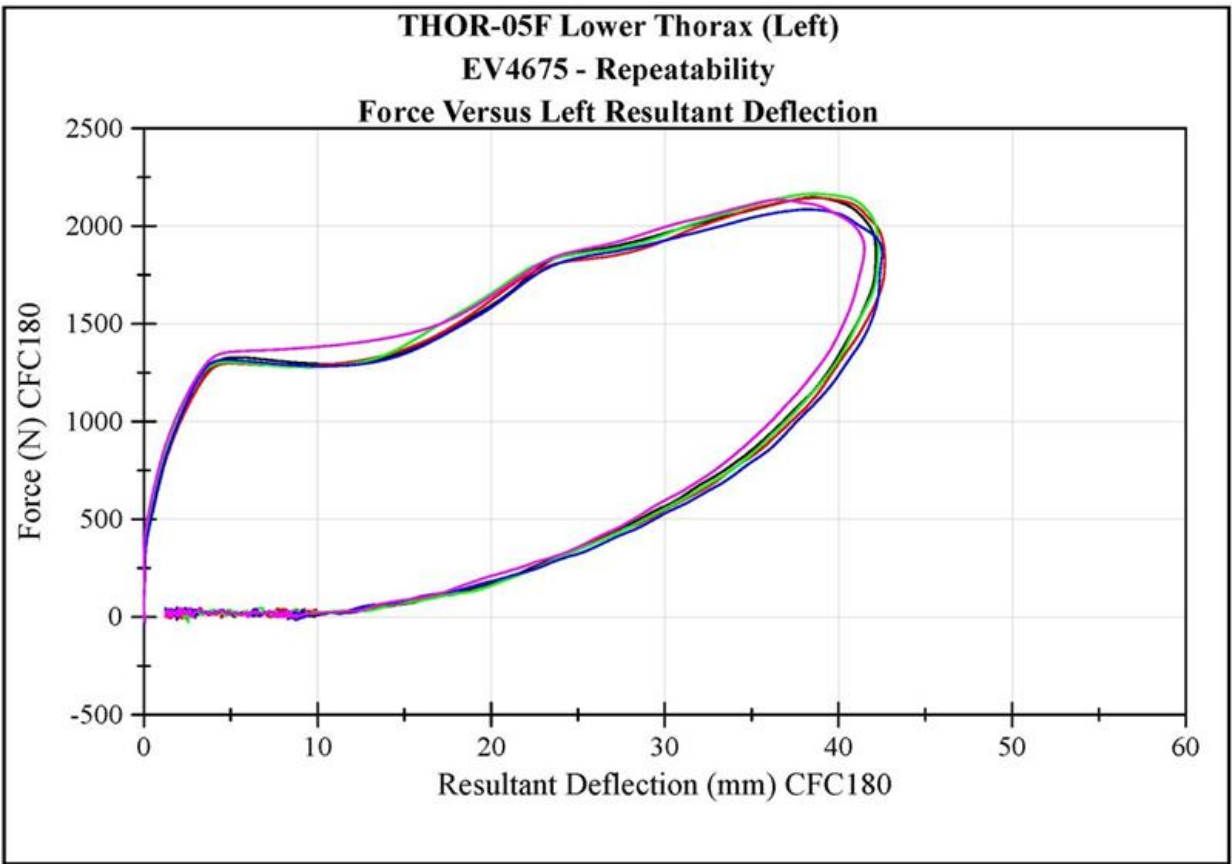
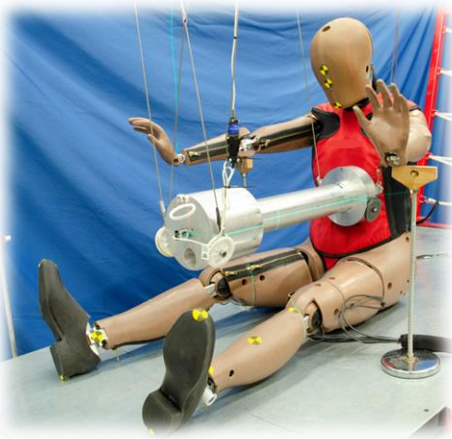
- Challenge for small female dummies, especially thorax
- Biofidelity and durability are often competing priorities
- No data loss, broken parts, or sensors under crash-level loading
- Rear-seat sled tests and increased energy probe/pendulum impacts

Body Region	THOR 5th	HIIL 5th
Head	Excellent	Good
Neck	Excellent	Poor
Shoulder	Excellent	Poor
Thorax	Good	Poor
Abdomen	Good	Poor
Lower Extremity	Good	Poor

Repeatability and Reproducibility:

THOR 5th provides repeatable and reproducible responses.

- 19 test modes head-to-toe
- 570 tests (3 ATDs, 4 labs)
- Coefficient of variation < 10%
- 42 qualification response corridors



Documentation

- See Docket ID NHTSA-2025-0622 for Drawing Package, Qualification Manual, R&R Report, Durability Report, and PADI.

Ongoing Research

- Injury criteria development, fleet testing, in-dummy DAS evaluations.