

A Look at Simulation and Prototyping Practices Across the Globe

Engineering.com audience survey
of simulation vs. prototyping



This research has been sponsored by
Dassault Systèmes.



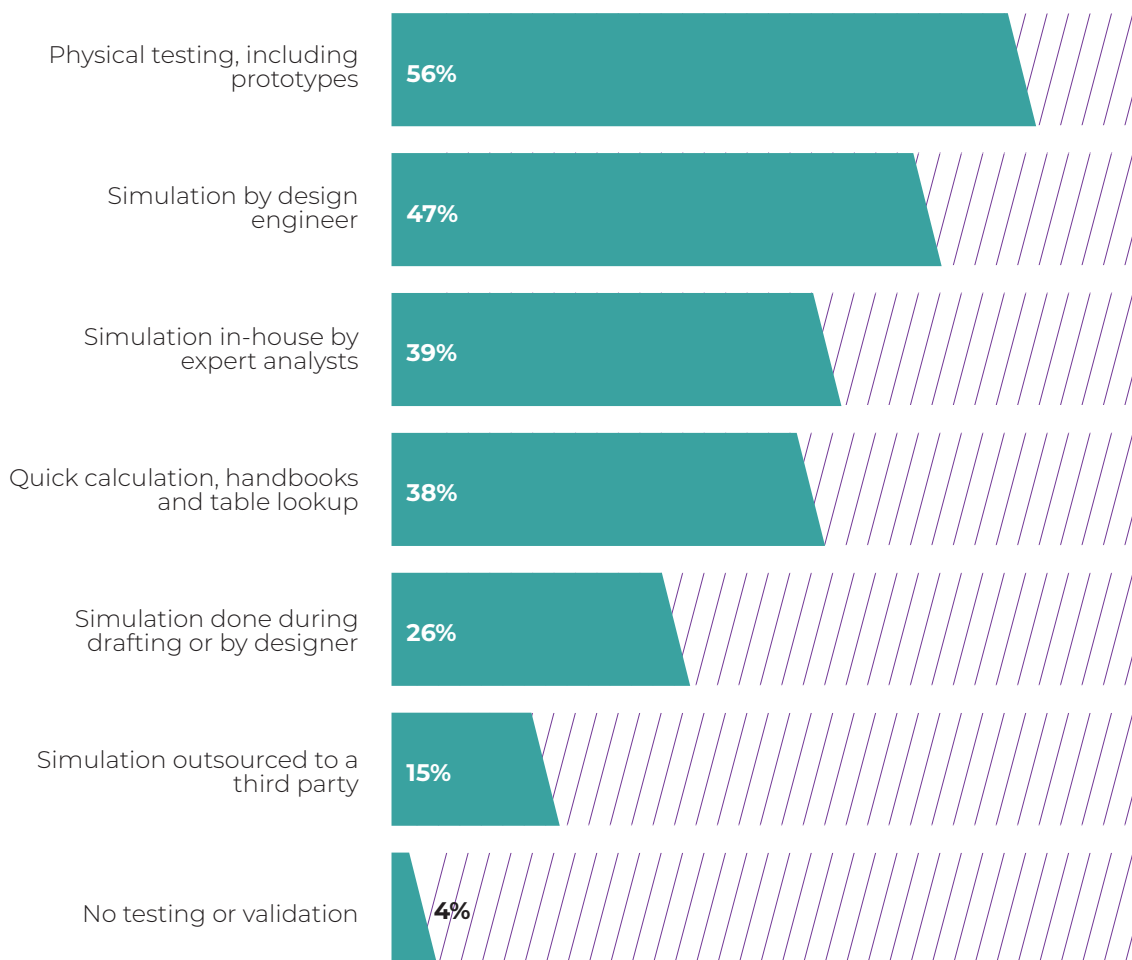
Model Validation and Optimisation Practices

HOW DO ENGINEERS VALIDATE THEIR DESIGNS?

We asked survey takers to reveal which testing methods they rely on to validate their designs. The majority (56%) implement physical tests, including prototypes.

That said, simulation is still a popular approach among our audience. Most simulations occur in-house; only 15% of respondents send their designs to a third-party vendor. In-house simulation is completed by both design engineers (47%) and expert analysts (39%).

Some respondents use quick calculations, handbooks and table lookups (38%) to validate their models. Only a small minority (4%) revealed that they neither validate or test their designs.

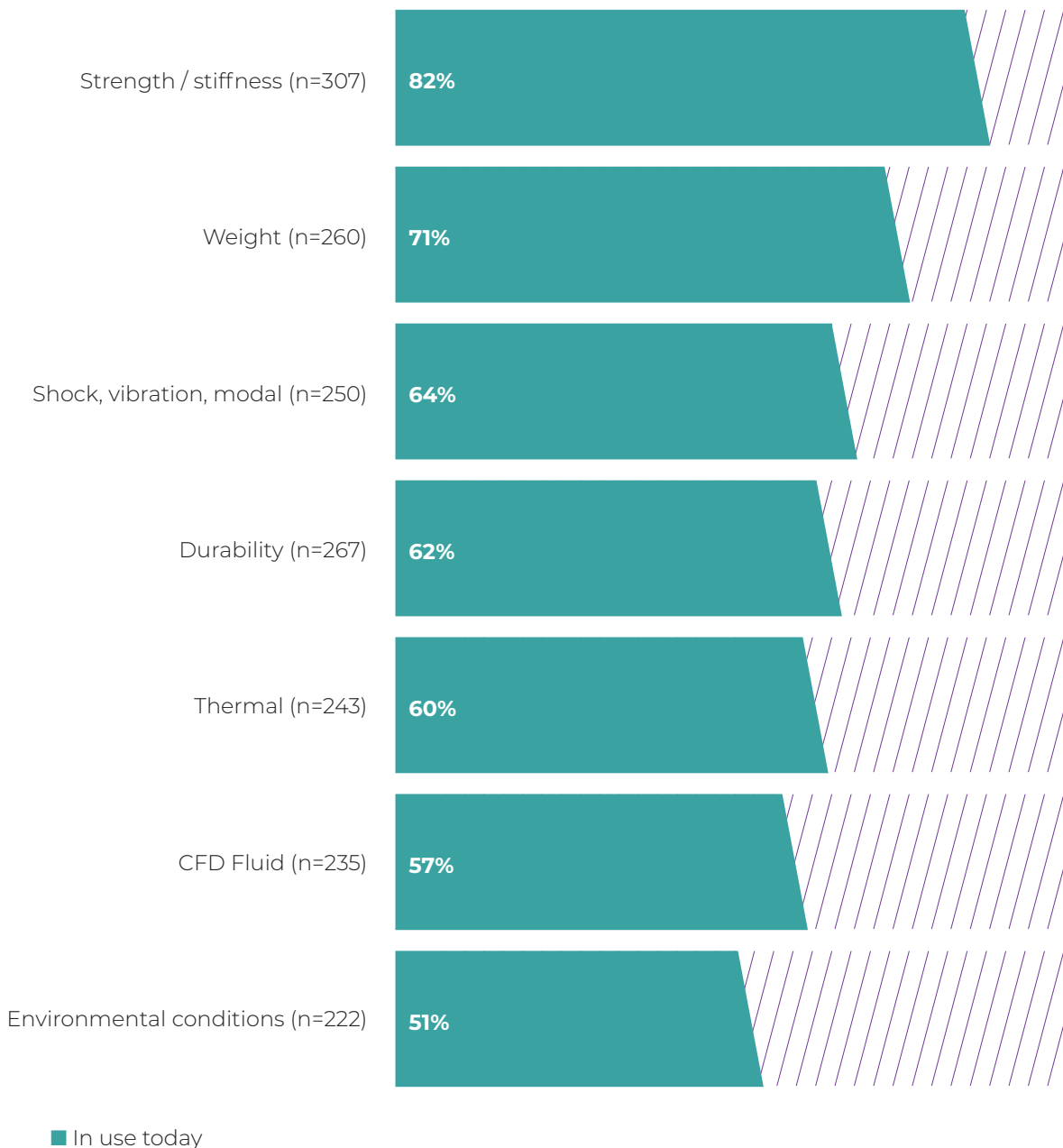


Q: How do you validate your designs? Select all that apply.

N = 329

WHAT OPTIMISATION STANDARDS DO ENGINEERS FOLLOW TODAY?

Our respondents used several criteria to reach the best design possible. The top 5 design requirements were strength/stiffness (82%), weight (71%), shock/vibration/modal (64%), durability (62%) and thermal (60%).

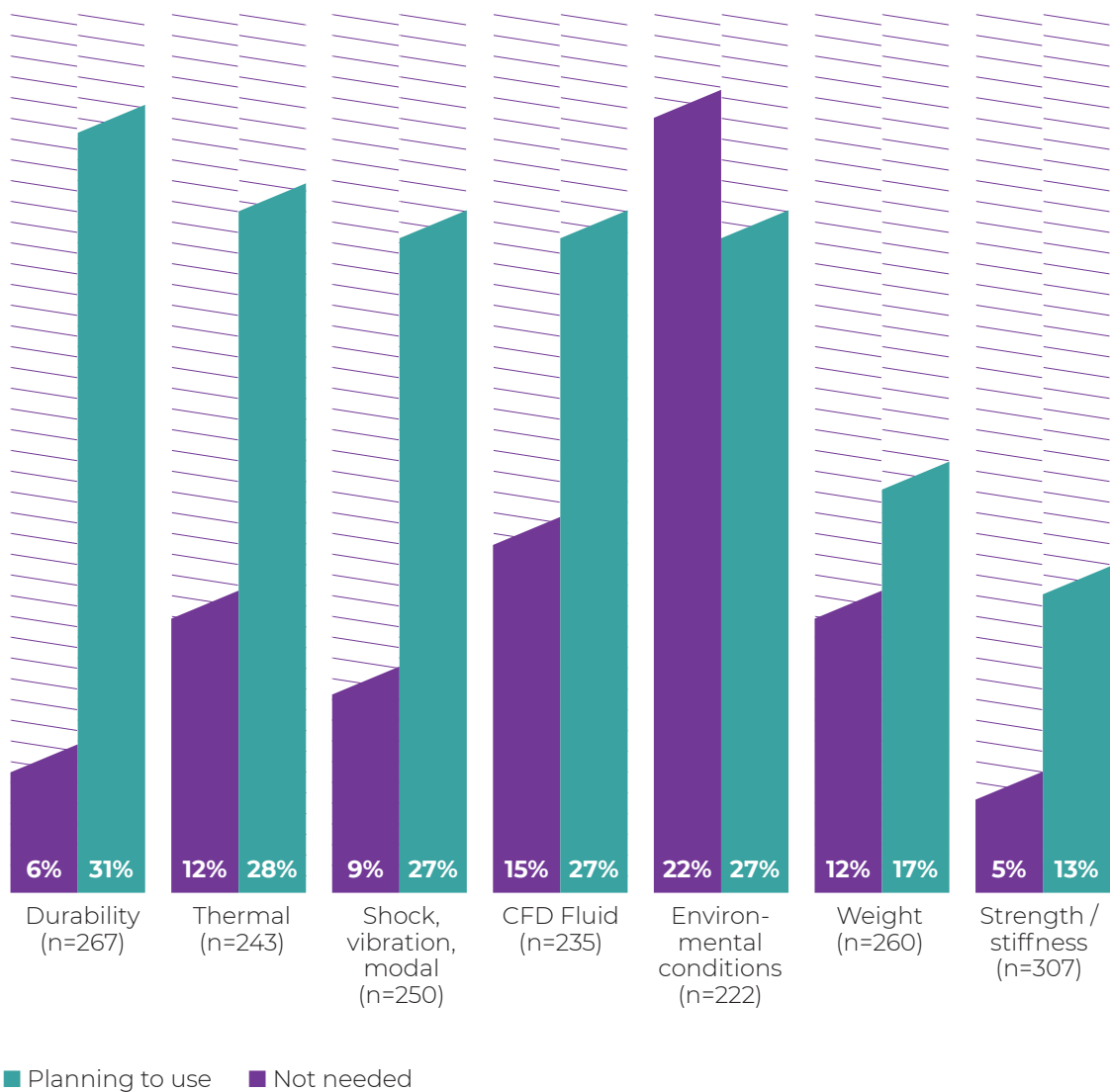


Q: Which requirements do (or should) your design engineering team use to optimise your designs? Showing responses for "IN USE TODAY."

WHAT DESIGN REQUIREMENTS DO ENGINEERS PLAN TO USE, AND WHICH ARE CONSIDERED UNNECESSARY?

Even though durability, thermal and shock/vibration/modal made it to the top five criteria currently in use, some users don't consider these factors at all.

A third (31%) of respondents noted that they plan to incorporate durability in future design optimisation, while 6% consider this requirement unnecessary. Thermal and shock are planned future requirements for 28% and 27% of respondents, respectively.



Q: Which requirements do (or should) your design engineering team use to optimise your designs? Responses for "PLAN TO USE" and "NOT NEEDED."



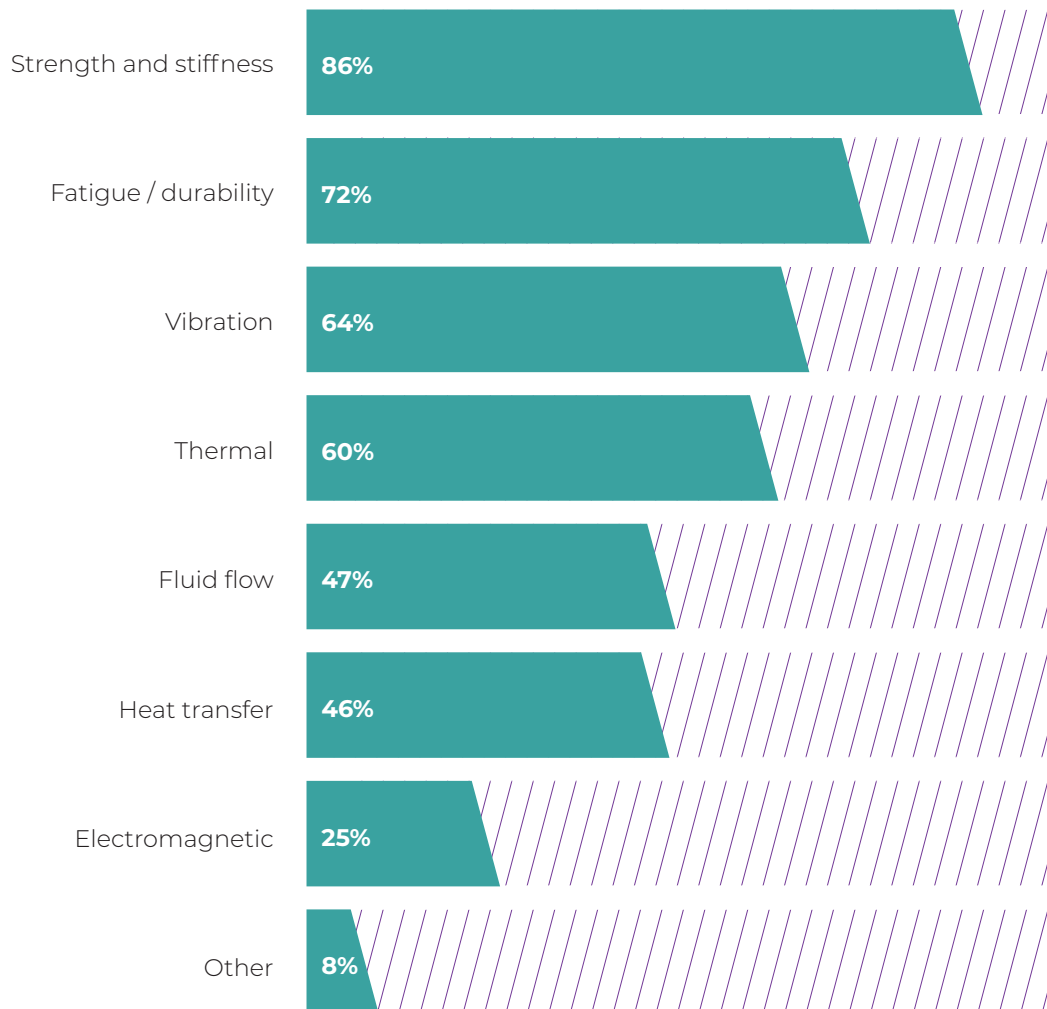
Physical Prototyping Practices

WHICH TESTS ARE USED MOST OFTEN TO VALIDATE DESIGN MODELS?

We asked respondents who use physical prototyping to select the test types that they have to run to validate their models. Strength and stiffness were selected by the majority (86%).

The majority of respondents also use physical prototyping to test for fatigue/durability (72%), vibration (64%) and thermal (60%).

Less than half of those who use physical testing validate factors like fluid flow (47%), heat transfer (46%) and electromagnetic properties (25%).

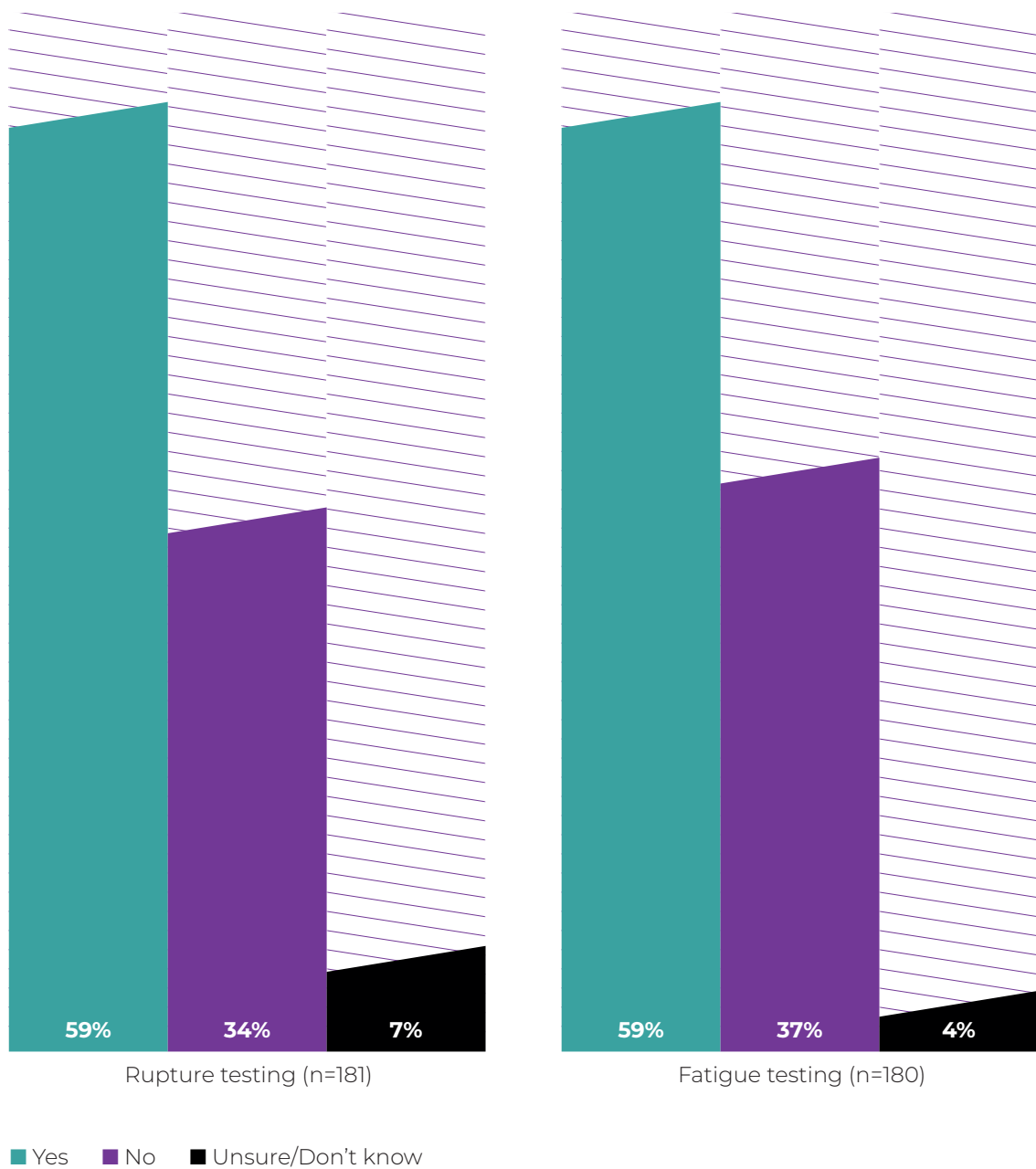


Q: What types of tests are required to validate your models? Select all that apply.

N = 177

DO ENGINEERS TEST FOR FATIGUE AND RUPTURES IN PHYSICAL PROTOTYPES?

The majority (59%) test their prototypes for ruptures and fatigue.

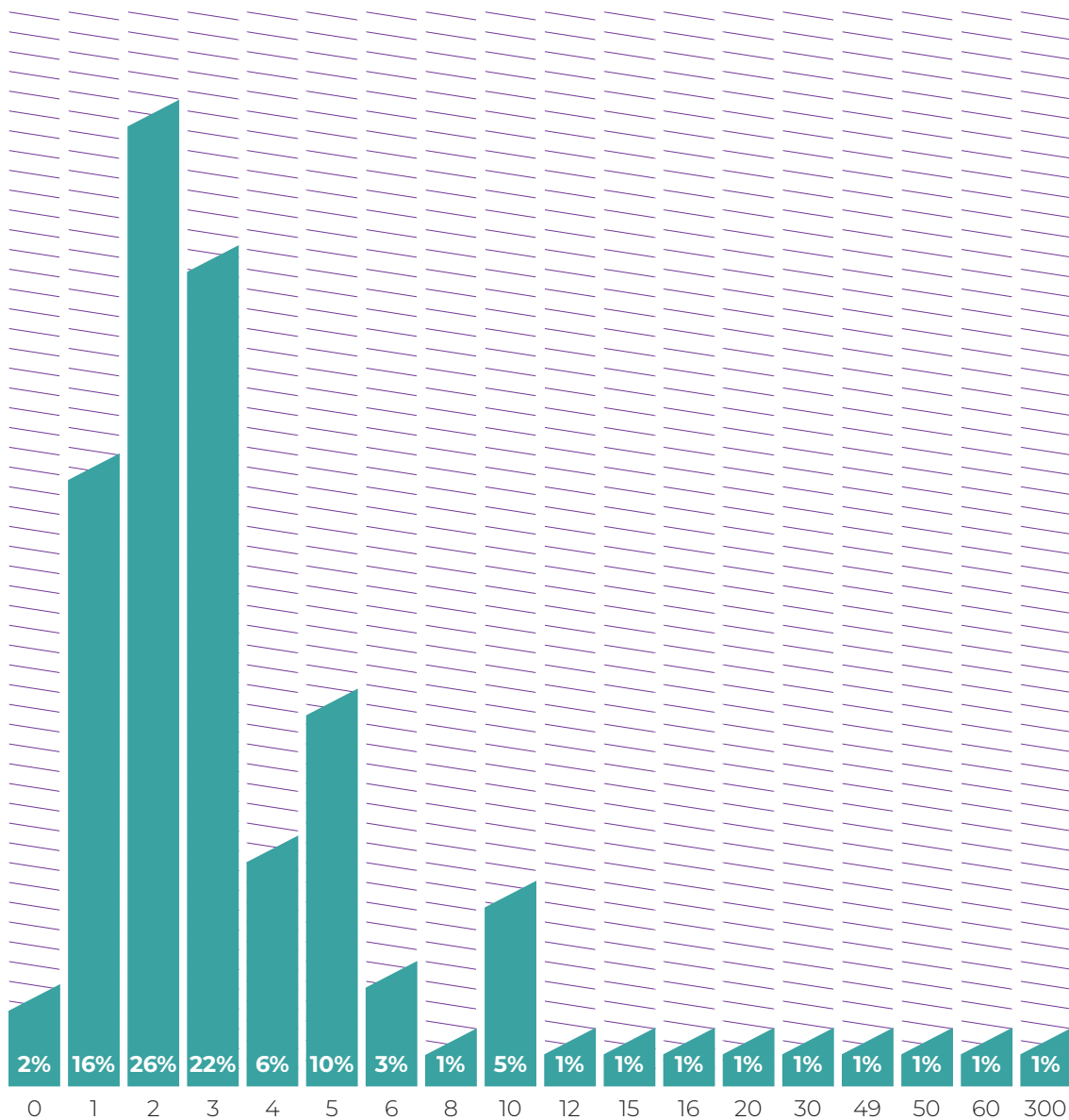


Qs: Do you test for ruptures in your physical prototypes?
Do you test for fatigue in your physical prototypes?

HOW MANY PHYSICAL PROTOTYPES ARE CREATED ON AVERAGE?

We asked respondents to estimate the number of physical prototypes they typically create before finalizing the product design.

On average, engineers created nine physical prototypes before finalizing their product designs.



Q: How many physical prototypes do you typically create before finalizing the product design [open text]

N = 159