# Creep Performance of SIPs

When utilizing Structural Insulated Panels (SIPs) for roof and floor applications, designers must address various load considerations. Alongside evaluating SIPs' ability to withstand gravity loads in transverse bending and function as diaphragms against lateral loads, designers must also account for the effects of long-term duration gravity loads, which contribute to creep.

Creep, the continued deflection of a structural member under permanent static load, can impact otherwise acceptable designs. To better understand SIPs' creep performance under long-duration gravity loading, a joint study sponsored by the USDA Forest Products Laboratory (FPL) and the Structural Insulated Panel Association (SIPA) was conducted, with physical testing at the FPL.

For this study, SIPs were evaluated to determine their creep performance in a moment-critical design situation. Testing involved static bending to failure to establish short-duration ultimate strength. The SIPs were then subjected to 90 days of constant static load, followed by a 30-day unloaded period to assess deflection recovery.

The study, detailed in FPL-RP-697, "Evaluation of Creep Performance of Structural Insulated Panels (SIPs)," revealed:

- The time/deflection curves for all specimens followed typical profiles for wood-based products, with no significant additional deflection observed after 90 days of loading.
- Post-creep specimens retained 90% of short-duration ultimate strength for 12-1/4-inch-deep SIPs and 100% for 6-1/2-inch-deep SIPs, indicating no significant loss in load capacity.
- Creep deflection as a percentage of total deflection was approximately 25% for both SIP depths.
- Initial elastic deflection recovery after load removal was 97% for 12-1/4-inch-deep SIPs and 99% for 6-1/2-inch-deep SIPs, indicating full elastic recovery.
- Creep deflection recovery ranged from 50% to 60% when the applied load was removed, with total deflection recovery ranging from 82% to 90%, suggesting a partially elastic response.

These findings align with a previous FPL study (FPL-RN-0332), supporting the use of a creep factor of 2.0 for SIPs utilizing OSB as facers, as specified in the National Design Specification (NDS).

The FPL reports referenced can be accessed at no charge from the FPL website. Additionally, these and other test reports are available for download from the SIPA website's technical resources.