

OpsPilot

Structural Assessment — User Manual

In-Service Structural Fitness-for-Purpose · AI Engineering Co-Pilot



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What this guide covers — what a structural assessment is, how the OpsPilot module structures it, what to have ready, and the output you receive.

Professional accountability. Structural assessment carries professional engineering accountability (CPEng-Structural or equivalent). OpsPilot structures the assessment; a competent structural engineer must review and certify it before it is relied upon.

1. What is a structural assessment?

A structural assessment determines whether an in-service structure — a steel frame, a concrete support, a pipe rack, a building — is still fit for its purpose, given its current condition and the loads it now carries. Structures degrade (corrosion, fatigue, cracking, settlement) and their duty often changes over decades (heavier equipment, new code loadings). The assessment compares what the structure can now carry against what it's now asked to carry, and drives the Continue / Derate / Strengthen / Replace / Decommission decision.

Applicable standards depend on structure type and jurisdiction — *AS 4100 / AS 3600 / AS 1170 / AS 5100 (Australia)*, *AISC 360/341 (US)*, *Eurocode 3/2 (Europe)*, *ASCE 11 (condition assessment)*, *ASCE 41 (seismic)* — and OpsPilot determines the right set from your inputs.

2. What the OpsPilot module does

Role	Responsibility
AI Coach — Senior Structural Engineer (OpsPilot)	Structures the assessment — condition survey (with ASCE 11 / AS 5100.7 condition rating), loading reassessment (current code loading versus original design), capacity assessment with degradation factors, the demand-versus-capacity comparison, and the Continue / Derate / Strengthen / Replace / Decommission decision.
Structural Engineer / Asset Owner (you)	Provide the structure context, condition observations, NDT data, planned changes and regulatory context — and you bear the professional engineering accountability.

3. How it works

- Condition survey — the current state, with a formal condition rating.

- Loading reassessment — current code loading versus the original design basis.
- Capacity assessment — applying degradation factors for corrosion, cracking, section loss.
- Demand-versus-capacity comparison — can it carry what it's now asked to?
- The decision — Continue / Derate / Strengthen / Replace / Decommission.

4. What you will be asked — have this ready

- The structure, its type and its original design basis (if known).
- Condition observations and any NDT data (section loss, crack sizes, corrosion mapping).
- Any planned changes to the loading or duty.
- The regulatory context and jurisdiction.

5. What you receive — the output

A structured Structural Assessment (Word): the condition survey and rating, the loading reassessment, the capacity assessment with degradation factors, the demand-versus-capacity comparison, and the Continue / Derate / Strengthen / Replace / Decommission recommendation — for competent structural-engineer certification.

6. Worked example (illustrative)

An ageing steel pipe rack now carries more lines than it was designed for. The condition survey finds section loss from corrosion at the column bases and assigns a condition rating. The loading reassessment compares the original design loads with the current code loads and the actual line loading today — which is higher. The capacity assessment reduces the members' capacity to account for the measured section loss. The demand-versus-capacity comparison then shows whether the corroded, more-heavily-loaded rack still has adequate margin. If it's marginal, the decision might be to strengthen the worst columns or derate by removing some lines; if it fails clearly, replacement. The whole chain is explicit so the certifying engineer can check each step.

7. Getting the best result

- **Reassess the loading, don't assume it.** Duty often crept up over decades beyond the original design.
- **Apply real degradation factors.** Measured section loss and cracking reduce capacity — use the NDT data.
- **Compare demand to capacity explicitly.** The margin (or lack of it) is the whole assessment.
- **Get it certified.** The decision carries engineering accountability — competent sign-off is required.

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