

AD 541:

Imposed roof loads in combination with PV

Photovoltaic arrays (PV) are becoming common on roofs. They're increasingly being added to new structures and retrofitted to existing ones.

The UK National Annex to [BS EN 1991-1-1](#) specifies the imposed load on roofs with a slope less than 30° to be 0.6 kN/m². Within the Eurocode system, the snow load is a separate variable action.

It would seem extremely unlikely that an imposed roof load of 0.6 kN/m² would exist over the entirety of a roof at the same time as the PV. Some level of load must however be allowed for, since it is to be expected that the PV will need maintenance. SCI recommends that when the PV load and imposed roof load are considered in combination, the imposed roof load should be taken as 0.4 kN/m². The value of 0.4 kN/m² has some provenance, since it is the recommended value of imposed load on the roof in BS EN 1991-1-1.

The combinations to be considered include:

Permanent + roof imposed load at 0.6 kN/m²
Permanent + PV + roof imposed load at 0.4 kN/m²
Permanent + PV + snow

Further combinations including wind will be necessary. It should be noted that the roof imposed load is not considered in combination with either snow or wind (BS EN 1991-1-1 clause 3.3.2 (1)). PV may be considered as a permanent action.

If they are not flat on the roof slope, snow drifting within and around PV arrays should be considered. The draft version of [BS EN 1993-1-3](#) proposes an increased snow load shape coefficient covering the area of the "tilted" panels and a distance all around the array. Some aspects of the requirement may be modified by the National Annex

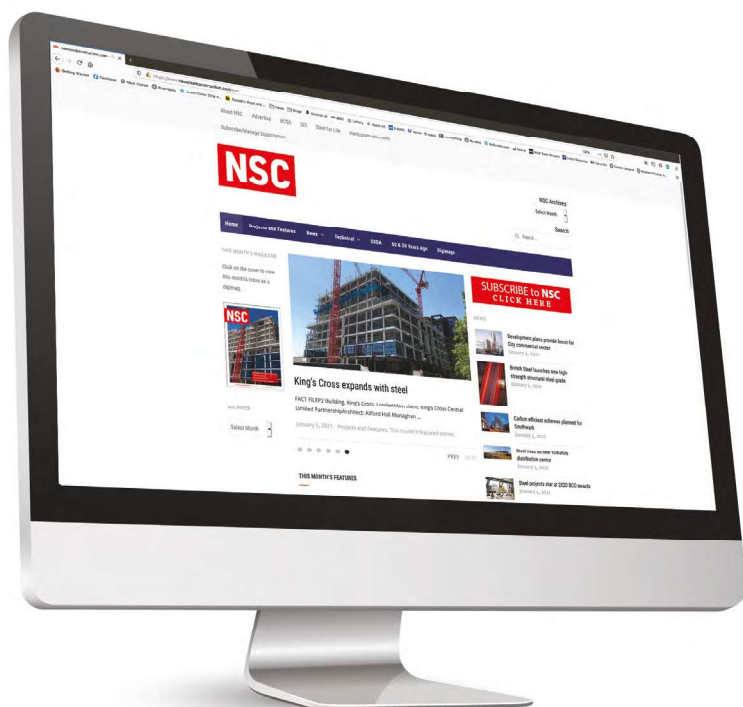
so the final detail may change, but the principle is clear.

When more than one variable action is included in the combination, one variable action should be identified in turn as the "leading" variable action. The remaining variable actions attract their respective ψ_0 factor.

The weight of the PV should be carefully determined, including the supporting structures and ballast. A nominal weight of 0.15 kN/m² should not be assumed as weights of 0.35 kN/m² have been reported.

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