SUMMARY

This publication presents a summary and analysis of research findings on the durability of galvanized cold formed steel sections used in housing; the results are used to calculate the predicted design life. These sections are produced from pre-galvanized strip steel. It reviews reports and publications from research projects carried out by Corus, BRE, ECSC, SCI and the former DETR on zinc coated cold formed steel sections. New data have also been collected from measurements on houses and similar buildings that use galvanized steel components.

The performance of galvanized (zinc coated) steel components within protected environments (e.g. 'warm frame' applications) is very good. This research shows that the predicted design life of the standard Z275 coating, based on the measured loss of zinc from the strip steel, is over 200 years, provided that the building envelope is properly maintained. The evidence for this conclusion is based on measurement of zinc loss on light steel frames in various applications and locations. A formula for the loss of zinc over time in areas subject to low condensation risk is presented.

The following table summarizes the expected design life of galvanized steel sections in common applications in buildings. Additionally, steel does not shrink, warp, or creep under load, and therefore does not contribute to cracking or deterioration of the non structural elements and finishes.

Design life of galvanized steel sections in common applications in buildings

Product application	Environmental conditions	Predicted design life
Walls and floors in warm frame applications	No risk of water ingress or condensation	250 years
Non-load bearing stud partitions	Warm internal environment and no risk of water ingress	250 years
Infill external walls in multi-storey buildings	Warm frame and no risk of water ingress	250 years
Roof structures (insulated)	Low risk of condensation	200 years
Suspended ground floors (with over-site membrane)	Low risk of water ingress; some risk of condensation	100 years
Roof structures (uninsulated)	Some risk of condensation	100 years
Purlins and side rails supporting metal cladding	Low risk of condensation; some dust and pollution	60 years
Sub-frames to over-cladding panels	Low risk of water ingress; some risk of condensation	60 years
Suspended ground floors (without over-site membrane)	Low risk of water ingress; higher risk of condensation	50 years

Note: All values are for Z275 (Total weight of zinc coating on both surfaces = 275 g/m^2)

Recommendations are given on the detailing of light steel framing in 'warm frame' applications in order to minimise the presence of moisture during the life of the building's frame.