

Life Cycle Assessment research for the Wood Windows Alliance

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Summary

This research examines the influence of modern substrate, design and coating systems on the service life and whole life cost of fully factory finished timber windows.

The work, commissioned by the Wood Window Alliance, was undertaken in accordance with the BS ISO 15686-8 (2006). Buildings and constructed assets - Service life planning Part 8: Reference service life and service-life estimation; and builds on earlier work conducted by Imperial College, London (2003/4) on behalf of Akzo Nobel Ltdⁱ

The work uses BS ISO 15686-8 methodology to account for the effect of factors such as timber substrate, "best practice" window design, factory applied paint systems and factory glazing techniques, on wood window service life. The impact of other factors, such as building design, location, and maintenance frequency, were also explored.

Our conclusions show timber windows, manufactured to the design, materials, quality and process procedures required by the Wood Window Alliance, will achieve a minimum estimated service life of 60 years. With attention to window positioning in building design, location, and adherence to recommended maintenance cycles, estimated service life can be increased significantly; with up to 87 years predicted in sheltered locations with average maintenance levels.

Whole Life Cost comparisons, based on a standard discounting model, were prepared over 60, 80 and 100 year cycles using published PVC-U service life data as a control. Timber windows, conforming to WWA standards, showed a typical lifetime cost advantage of 2% rising to 7% when "best practice" building design factors were in place.

Background

Several Life Cycle Assessment (LCA) studies have examined the environmental impacts associated with wood windows, many in comparison with alternative framing materials (particularly PVC-U). In 2003 and 2004 Dr Richard Murphy and Bill Hillier of Imperial College London undertook detailed LCA work commissioned for Akzo Nobel Woodcare (ANW). That work was conducted in accordance with the ISO 14040 series of standards for LCA and the overall findings were placed in the public domain by ANW at the time. The study showed that the manufacture, use and disposal of good quality, factory finished, preservative treated softwood windows using good quality opaque or translucent coating systems and recommended maintenance intervals offered environmental advantages over a PVC-U alternative, notably in Global Warming potential and fossil energy consumption.

The present report is based on this earlier work, updated to reflect the performance of wood windows manufactured, installed and maintained to the standards of the Wood Window Alliance industry group.

Scope

Commissioner: The Wood Window Alliance

Provider: Imperial College Consultants Ltd., December 2009 to March 2010

LCA Practitioner: Dr Richard Murphy, Imperial College London

ⁱ ANW Woodcare Study: Dr Murphy and Mr W. Hillier