

Douglas Fir

Weathering & Ageing - Expectations & Mitigation

Sketch

321_Power Hall

321_SK080922_Douglas Fir_Weathering & Ageing - Expectations & Mitigation

08.09.2022

In response to Russia's invasion of Ukraine, the Museum of Science and Industry and the design team for Power Hall have sought an alternative to Russian-grown Siberian Larch for use as an external cladding material. The Design Team have researched a range of alternative timber species against various metrics including cost, performance, procurement and sustainability, concluding that Canadian grown Douglas Fir is an appropriate choice.

Suitable properties of Douglas Fir:

- Strength / Stability - Douglas Fir is a strong softwood, considerably more resilient to movement, and will endure knocks and scratches better than comparative softwoods;
- Versatility - Owing to its strength, long lengths and ease of fabrication, Douglas fir is favourable for cladding applications. It is also aesthetically striking; few knots and the rich red base tone will complement the red brick of Power Hall;
- Density / Durability - Douglas fir is dense in comparison to other softwoods, it is therefore durable and has a life expectancy of +35 years (increased with appropriate treatment). Additionally, owing to a high resin content, Douglas fir can be left untreated in external environments;
- Suitability – Douglas fir has already been specified for use on the internal cladding of Power Hall and is therefore a suitable choice for this exterior application, providing a coherent visual language between the interior and exterior;
- Acceptance of treatment – Douglas fir will readily take protective coatings and treatments.

Weathering, ageing and mitigation:

Like all timbers, especially in external applications, Douglas fir is susceptible to weathering, based on atmospheric conditions and exposure, the effects of which can lead to significant bleaching/silvering, isolated staining, and delignification (whereby the top surface fibres of the timber become furry). These risks are mitigated by:

- Specifying heartwood rather than sapwood timber (the denser, dryer and stronger central core of a tree);
- Specifying quarter sawn timber, where the grain runs from face to face, rather than edge to edge, which is the most dimensionally stable cut;
- Ensuring the timber is kiln dried at source and prior to import, thus reducing the overall risk of fungal/ insect infection to the timber and the risk of importing fungal infections to UK domestic trees;
- Specifying a protective pigmented topcoat finish.

Finish:

The application of a protective pigmented topcoat, in this instance Natural Oil Woodstain by OSMO, will provide protection from UV, significantly minimise impacts of bleaching and weathering on the timber.

The advantage of penetrating stains is that they are easier to maintain as, unlike film-forming finishes, they do not crack, peel or blister even if excessive moisture enters the wood. Penetrating stains will also provide a more natural appearance as they permit much of the wood grain and texture of the wood to show through.

Overtime there will be some greying of the timber, and dependant on the exposure (orientation) of the timber cladding a maintenance cycle of 4-6 years in anticipated. If surfaces show signs of wear or a loss of weather resistance over time, they will need to be cleaned down and a maintenance coat of OSMO Natural Oil Woodstain will need to be added over the existing finish.

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Quarter sawn Douglas Fir timber samples prior to the application of a protective topcoat,



Quarter sawn Douglas Fir timber sample following the application of a protective topcoat (left),



Untreated Douglas fir cladding, 16 years after installation. The cladding shows signs weathering including bleaching, isolated staining, and delignification. The performance is not affected however.