Key points

- *This information note deals with the durability of timber cladding and provides general guidance on fixings and their design.*
- *Cladding durability considerations include: the natural durability of the timber used, the level of preservative treatment, the desired design life, detailing of the cladding, the type of coating, if any, on the cladding, maintenance levels, location and height of the building.*
- *External cladding should have a moisture content of 16% (+/- 3%) at the time of installation.*
- *The moisture content of external timber cladding will be subject to continuous variation due to changing climatic conditions. Changes in moisture content will result in dimensional movement in the cladding, in particular in the thickness and width of the timber. Good design and installation will help reduce the effects of exposure to moisture.*
- *External cladding not made from an inherently durable timber species will require treatment with a preservative.*
- *Pine and spruce cladding should be pressure treated with preservative to Use Class 3. Supporting softwood battens should also be pressure treated to at least Use Class 2.*
- *Where a protective coating is used, it should be applied to all faces and edges before the cladding is installed.*
- *Screws and nails should be corrosion resistant – austenitic stainless steel is recommended, while screw fixings are recommended for hardwood and higher density timbers to resist distortion forces.*
- *Fixings for cladding and support battens should be designed and specified to cater for wind and other loads acting on them*
- *Double fixing in hardwood is recommended and holes should be pre-drilled slightly oversize to allow for expansion and shrinkage.*
- *Tongued and grooved boards should have a maximum face width of 125mm with at least a 2mm space in the T&G joint to accommodate movement of boards.*
- *Horizontal boards should be installed with the tongue facing upwards / Vertical board should be installed with the tongued edge facing into the prevailing driven wind direction.*
- *Timber species such as western red cedar and oak can become stained by compounds such as tannins being leached out by exposure to rain. Normally the staining is eventually washed away.*

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External Timber Cladding – Guidance on Materials, Specification, Detailing and Design

Bill Robinson and Bob Davis

Introduction

Timber can be attractive as an architectural cladding to the exterior of a building and is the most common external finish to Scandinavian, American and Canadian homes. Cladding has been used on the exterior of many buildings in Ireland and is becoming increasingly popular with building designers. For cladding to be used successfully, durability staining, maintenance, correct specification and detailing all have to be considered at an early stage.

This note provides information on external timber cladding used in domestic dwellings, while some of the information may also relate to larger or taller buildings these are not the focus here. It deals with specific points such as durability of timber and provides general guidance on fixings and their design; a brief description of the results of a survey on timber cladding carried out in Dublin City is also included.

Reference Standards

I.S. EN 1995-1-1: Eurocode 5: Design of timber structures.

I.S. EN 14915: Solid wood panelling and cladding – Characteristics, evaluation of conformity and marking.

I.S. EN 15146: Solid softwood panelling and cladding. Machined profiles without tongue and groove.

I.S. EN 350: Durability of wood and wood-based products – Testing and classification of the durability to biological agents of wood and wood-based materials.

I.S. EN 335: Durability of wood and wood-based products – Use classes: definitions, application to solid wood and wood-based products.

I.S. EN 13556: Round and sawn timber. Nomenclature of timbers used in Europe.

I.S. EN 1310: Round and sawn timber: Method of measurement of features.

BS 8605-1: External Timber Cladding: Method of specifying.

BS 8605-2: External Timber Cladding: Code of practice for design and installation.

BS 8417: Preservation of wood. Code of practice.

Timber Durability

The timber species listed below have been considered suitable for cladding by practice; a number of imported timbers including western red cedar are available as various finished commercial products.

Irish softwoods:

- Western red cedar
- Larch
- Norway/Sitka spruce
- Douglas fir
- Scots pine

Imported softwoods:

- Canadian western red cedar
- European / Siberian larch
- European whitewood
- North American Douglas fir
- European redwood

Hardwoods:

- European oak
- Sweet chestnut
- Balau
- Iroko
- Opepe

Consideration of durability requirements is dependent on a number of factors:

- The natural durability of the timber used
- The level of preservative treatment
- The desired design life
- Detailing of the cladding
- The type of coating, if any, on the cladding
- Maintenance levels
- Location and height of the building

Wet rot is the most likely fungus that could potentially attack timber cladding; wet rot is a generic term used to define a variety of fungi species (the most common species is *Coniophora puteana*); removal of the source of water usually cures the problem as wet rot cannot spread in dry timber. Wet rot can however cause extensive damage and will continue to spread if left untreated. Wet rot and dry rot require timber to have moisture contents over 20%. Dry rot can however transport water and nutrients through fungal strands from a moist area to a new area where the timber is dry and so can spread throughout a building.

The main form of timber attack is from fungal attack rather than insect attack; however, most modern preservatives contain chemicals that help protect the timber from both fungal and insect attack.

Use Class

Use classes relate to the exposure level of timber to fungi and insect attack and in the case of fungi attack it relates mainly to the exposure risk to moisture. Use classes are defined in I.S. EN 335 “Durability of wood and wood-based products - Use classes: definitions, application to solid wood and wood-based products”. Use class helps to assess the required durability of a particular timber to its intended end-use.

External timber cladding falls into use class 3, the same use class as external joinery. I.S. EN 335 subdivides use class 3 into two sub-groups 3.1 where the wood will not remain wet for long periods or where water will not accumulate and 3.2 where the wood will remain wet for long periods or where water will accumulate. Therefore cladding details should follow good practice and shed water away from a building and avoid the accumulation of water.

Cladding is usually fixed to softwood timber battens; with good detailing these battens would normally be considered to be in Use Class 2 but should be pressure treated with a timber preservative to improve the service life.

Natural durability of timber

The natural durability of a number of timber species is given in I.S. EN 350:2016 “Durability of wood and wood-based products - Testing and classification of the durability to biological agents of wood and wood-based materials”; natural durability is also influenced by the origin of the timber i.e. where it was grown.

Note. The natural durability ratings relate to the inner heartwood of a timber species and not to the outer sapwood which in every case is non-durable.

While natural durability in EN 350 is largely based on laboratory or field tests for timber in ground contact (use class 4), the system is used to specify requirements in other use classes.

I.S. EN 350 gives the following durability class definitions for fungi attack:

- Durability class 1 (DC1) Very durable
- Durability class 2 (DC2) Durable
- Durability class 3 (DC3) Moderately durable
- Durability class 4 (DC4) Slightly durable
- Durability class 5 (DC5) Not durable

Dependent on factors such as the desire service life and use class (i.e. generally use class 3.1 or 3.2), the required durability class of the timber can be determined; this can assist in assessing the need for preservative treatment.

Natural durability of some timber species

The durability class for heartwood for fungal attack of the timbers below have been taken from Table B.1 of I.S. EN 350; this standard should be consulted for more information and for other species. Only the common name of the timber has been given and I.S. EN 350 can be consulted for the scientific name if required and for other species.

Table 1: Durability classes of some timbers

Common name	Timber code[7]	Origin	Density (kg/m3) at 12%MC	Durability class[8]
Western red cedar[9]	THPL	North America	330-370-390	2
		UK/Ireland		3(1)
Larch	LADC, LAKM, LAER, LAOC	Europe, Japan, Hybrid	470-600-650	3-4
Norway spruce	PCAB	Europe	440-460-470	4 (4-5)
Douglas fir	PSMN	North America	510-530-550	3
		Europe	470-510-520	3-4 (3-5)
Scots pine Redwood	PNSY	Europe	500-520-540	3-4 (2-5)[10]

The durability of commercial groupings or where the durability class of a species has a range of values, the durability should be based on the lowest durability class (e.g. 3-4, then DC4 should be assumed).

Timber with sapwood present should be considered to be not durable; most timbers have some sapwood present and therefore can be assumed to be in DC 5 but some commercial claddings may be available where sapwood is excluded.

It can be difficult to differentiate between sapwood and heartwood in some timber species and the services of a timber specialist may be required to identify the presence of sapwood.

Natural durability recommendations

The natural durability recommendations below are based on the Wood Protection Association (WPA) manual and BS 8417 "Preservation of wood - Code of practice".

Table 2: Natural durability recommendations for timber components against fungi

Use class	Durability class for heartwood[1] without preservative treatment for the desired service life shown		
	15 years	30 years	60 years
3.1	4	3	2
3.2	3	2	1

[1] *That is, sapwood is not present.*

The designer must decide on the desired service life. For domestic buildings, this will normally be for 60 years while for other buildings especially temporary buildings this could be lower.

The decision to allocate timber cladding to use class 3.1 or 3.2 is up to the designer. In general, it would probably be considered to be in use class 3.1 if detailing of the cladding resisted water accumulation and especially if the cladding protected by a coating. However, the designer specifier should take into account if the coating will be maintained and maintenance requirements should be specified. Further advice should be obtained from the coating manufacture.

Note. Where a protective coating such as a preservative wood stain is specified this should be applied to all faces and edges of the boards prior to fixing the boards in situ. Where the outer face only is coated there is an increased risk of distortion and cracking of the boards in particular where the boards are south facing.

Timber is often selected because of appearance and species and therefore the natural durability class will be set.

[7] *Code according to EN 13556*

[8] *For fungal attack, the figures in brackets refer to laboratory tests aimed to determine the durability against basidiomycete fungi i.e. wet rot.*

[9] *Western red cedar has a low density and this may affect the performance of fixings.*

[10] *This species exhibits a wide range of durability against basidiomycete fungi when tested under laboratory conditions.*

Preservative treatment

The durability or service life of timber can be improved by treatment with a timber preservative. Guidance on treatment can be found in the WPA manual and/or BS 8417.

These documents also subdivide use class 3 into two groups based on whether the timber is coated or not; coated can be considered as being the equivalent of use class 3.1.

If the natural durability of the timber is considered to be inadequate then preservative treatment can be used to increase the timber's durability. However, according to the WPA and BS 8417 *uncoated* cladding can be treated but would only give a 30 year desired service life and therefore unless there is evidence to the contrary the durability of cladding beyond 30 years should be based on the natural durability of the timber with sapwood excluded from the material. According to the WPA and BS 8417 treated timber with a protective coating could provide the desired service life of up to 60 years but this would almost certainly require some level of maintenance to the coating.

Preservation would be considered optional in low risk (or low cost) situations and could be regarded as mitigating the cost of repairs or where remedial work is not expensive or difficult.

Treatment of external cladding with a protective preservative coating will help to reduce moisture movement, maintain a uniform surface appearance and increase the overall service life of the timber.

Maintenance

The maintenance of a coating in relatively tall buildings such as apartments can be difficult as the cladding tends to be exposed to more severe weather conditions resulting in a relatively early breakdown of the coating. Further, apartments can be rented out and any developing problems can remain undetected without regular inspections by the property owners or Management Company.

In addition, cladding may not be subject to any proper maintenance levels quite frequently because this was not considered at the design stage or the relevant information not passed on to the building owner or Management Company. Therefore in such buildings, it is important for maintenance requirements to be specified by the designer and the information given to the building owners.

With smaller single or two-storey buildings, developing problems are easier to detect and to repair or maintain. This means that any signs of decay will often be limited in scope and if signs of decay are detected early often a brushed on preservative will extend the life of the affected area and postpone the need for remedial work to take place.

There are a wide range of products available to help cladding and further advice should be sought from the manufacturer of these products.

The sealing of the ends of cladding should help durability or at least the appearance in the medium to long term. The ends of cladding should not touch surfaces that may attract water or get damp.

Examples of Commercially Available Cladding Profiles

Tongue and groove, bevelled face

Tongue and groove, bevelled both faces

Tongue and groove, faces flat

Ship lap

Feathered edge

Tongue and groove, bevelled face showing adjacent board with expansion gap

Ship lap showing adjacent board with expansion gap

Tongue and groove, rounded face showing adjacent board with expansion gap

Example of selecting a timber species

The examples below relate to the timber species included in this information sheet but I.S. EN 350 gives information on the durability classes of other timber species and a different timber could be specified using that standard rather than the limited examples given in Table 1 above.

Example 1: The cladding is considered to be in use class 3.1 with the desired design life of 30 years.

From Table 2 the natural durability required is DC3. From Table 1 the following species are suitable (subject to sapwood being excluded); Western red cedar and Douglas fir from North America.

If sapwood cannot be excluded then consideration should be given to specifying preservative treatment.

Example 2: The cladding is considered to be in use class 3.1 with the desired design life of 60 years.

From Table 2 the natural durability required is DC2. From Table 1 the only species suitable (subject to sapwood being excluded) is Western red cedar from North America.

Example 3: The cladding is considered to be in use class 3.2 with the desired design life of 30 years.

From Table 2 the natural durability required is DC2. From Table 1 the only species suitable (subject to sapwood being excluded) is Western red cedar from North America. A different timber species could be selected from I.S.EN 350 or a timber preservative treatment specified.

Example 4: The cladding is considered to be in use class 3.2 with a desired design life of 60 years.

From Table 2 the natural durability required is DC1. Table 1 has no species suitable. A different timber species could be selected from I.S.EN 350 or a timber preservative treatment specified. It is likely that a high performance coating would have to be used and/or a good maintenance schedule specified.

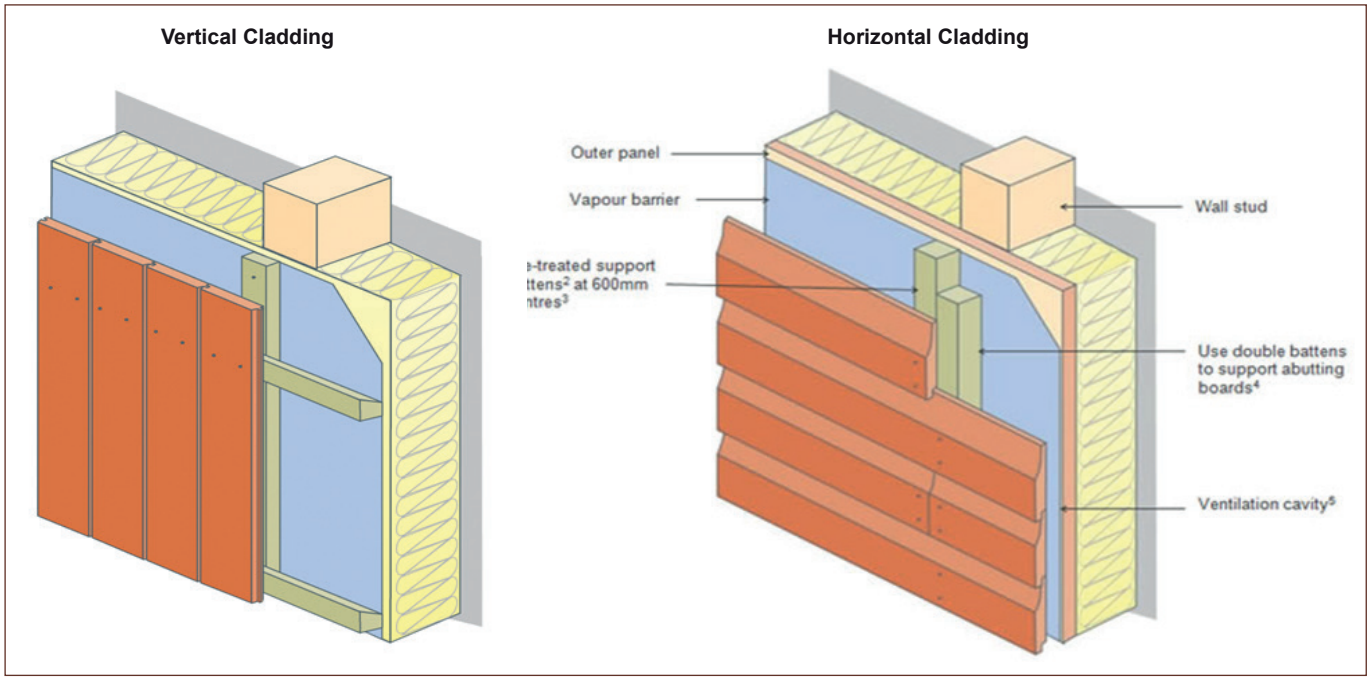
Timber support battens

The Use Class of battens behind cladding is usually considered to be in Use Class 2; however, cladding battens are usually softwood and preservative treated by practice. In timber frame construction the battens will also act as cavity barriers and therefore will require preservative treatment as specified in I.S. 440; in addition, the battens will have to have a minimum thickness of 38mm in the plane of the cavity (Figure 1).

In timber frame buildings battens should be placed at stud centres; battens should be fixed through the sheathing into studs and the general framing of the external wall.

Preservative treatment should be applied under pressure and any ends cut after treatment should be liberally coated with a suitable preservative. The WPA manual and BS 8417 give guidance on treatment depending on the desired service life and the use class and should be consulted for further information.

Figure 1: Examples of Use Class 2 battens in cladding configurations



Fire requirements

Fire requirements are largely covered in Technical Guidance Document B Fire Safety Dwellings Volume 2, Section 4 - external fire spread. TGD B is largely limited to dwellings where their height is not over 15m; where this height limit is exceeded some of the requirements of Volume 1 might apply.

Clauses 4.4.3 and 4.5.6 apply amongst others e.g. space separation may apply.

In clause 4.4.3 where an external wall is less than 1m from the relevant boundary, the external surface of the external wall should have a reaction to fire classification of B-s3,d2. According to the TGD timber with a density of more than 400k/m^3 typically has a classification of D-s3,d2 and therefore would not satisfy this requirement. Western red cedar has a density under 400kg/m^3 (see Table 1) and therefore specialised advice should be sought where this timber is to be used in this situation. Where an external wall is less than 1m from a relevant boundary there are also limits on the unprotected area (where the fire resistance is less than that required by TGD B) in clause 4.5.7.

There are no restrictions on the reaction to fire performance of timber cladding where the wall (including the cladding) is 1m or more the relevant boundary. However, there may be limits on the area of cladding on the wall depending on the wall having the required fire resistance (clause 4.5.6).

Space separation requirements between buildings also govern the maximum permitted unprotected area.

The requirements of TGD B (both volumes) should be consulted as detailed fire requirements are outside the scope of this information sheet.

Fixings

Durability

The durability of fixings is dependent on atmospheric conditions and timber corrosivity. Cladding will usually have moisture contents in the range of 16 to 20% (with proper detailing and workmanship) but atmospheric corrosion is dependent on whether or not the fixings are exposed to the weather, the climate humidity, exposure to pollutants and the distance to the sea. The fixings for the cladding therefore would be considered as exposed while the batten fixings would usually be considered as not exposed.

The WTI/COFORD Connects Note (number 14) should be consulted for further information.

Design

Timber cladding is lightweight and therefore the design of fixings essentially has to cover the forces acting on the cladding from the wind; the main design criterion being suction or negative wind forces.

Wind forces should be calculated from I.S. EN 1991-1-4 *Actions on structures – Part 1-4: General actions - Wind actions* and fixings designed to I.S. EN 1995-1-1 *Design of timber structures – Part 1-1: General – Common rules and rules for buildings*. The calculation of wind forces acting on a building is complex but generally, wind forces are greater on the west coast than on the east coast and increase with building height and closeness to the sea. Negative wind forces acting on a wall in a rectangular are usually highest at corners on the face at right angles to the direction of the wind[11].

The failure modes of fixings are;

- The cladding can pull through the head of the fixing
- The point of the cladding fixing can pull out from the batten
- The batten can pull through the head of the fixing
- The point of the batten fixing can pull out from the wall

Most fixings used in cladding are nails; I.S. EN 1995-1-1 gives information on the calculation of the load capacity of axial loaded nails for smooth nails and for 'other' nails. The standard has a formula for smooth nails but requires other nails to be tested to determine their withdrawal strength. Experience indicates that often smooth nails fail to provide adequate resistance to nail withdrawal, although they might work in some cases e.g. where wind forces are low and perhaps in some areas of a wall. Whether control on site can accommodate two different fixing schedules (e.g. one at corners and a lesser one away from the corners) is doubtful.

According to I.S. EN 1995-1-1 (Eurocode) where the timber is especially prone to splitting the nail holes should be predrilled.

Slightly oversized pilot holes should be pre-drilled to allow for movement caused by dimensional changes due to variations in moisture content. Fixings for external hardwood cladding, particularly at the the ends of the cladding, may need to have a higher resistance to withdrawal than fixings to softwood due to higher forces in hardwood associated with distortion.

Nails (and screws, staples, dowels and bolts with nuts) should comply with I.S.EN 14592 *Timber structures – Dowel type fasteners – Requirements*. As this is a harmonised standard the fastener manufacturer must CE mark their product and provide a Declaration of Performance (DoP); both these requirements should contain design information for the fixings but usually, it is the DoP that is used for design information.

11. Where nail guns are used for fixing cladding boards it is important to ensure that the nail heads used will resist pull-through under wind loads

A designer should check the DoP of a proposed fixing to see if the withdrawal performance is adequate. Manufacturers of smooth nails should also have a DoP and many would rely on calculation to I.S. EN 1995-1-1 for withdrawal properties.

The DoP should be checked that the timber species and/or strength class of the timber in the DoP applies to the timber proposed for use. Other checks should include that the timber species being used is not prone to splitting although blunting nails may reduce the risk of splitting.

Some nails coatings might affect nail withdrawal properties and this should be considered by the designer.

Survey of timber cladding

A survey of timber cladding used in Dublin City in a range of different buildings was carried out in 2007 by Sean Wiley and Associates the findings included;

Colour variation

Individual boards can exhibit colour variation although generally, the number is small.

Unless treated with a coloured wood stain timber typically ages to a silver-grey colour, natural variation in the material and other factors include atmospheric pollution can affect this.

Colour variation from the original colour of the cladding included that due to water stains at rainwater run-off points together with stained areas associated with prolonged moisture retention or exposure e.g. splashing from roofs or the ground. This could have been avoided in most cases by better detailing.

Colour variations included that associated with direct exposure to sunlight. Shaded areas such as underneath windows, roof canopies, and overhangs contrasted with exposed areas.

Streaks and spot dark staining from the use of non-stainless steel fixings (even when plugged) was noted but were not widespread.

Staining had frequently extended to other materials and parts of the building.

Heavy staining had in some instances reduced the original character and definition of the building as well as negatively impacting on the immediate surroundings.

Algal growth can occur due to a lack of sunlight and high moisture.

In some areas, black/ dark blue staining has significantly affected the appearance of the buildings from that intended by the architect.

Other sources of staining could include extraction staining (the redistribution of naturally occurring tannins).

Cladding boards

The most common type of cladding boards encountered in the survey were laid horizontal and were fixed to vertical battens on timber frame, steel and masonry walls.

The boards were generally rebated tongued and grooved exhibiting face widths in the region of 85 mm to 150 mm.

The primary species used were Western red cedar, Oak and Iroko.

Recommendations

Cladding boards

Recommendations from TRADA on horizontal tongued and grooved boards suggest that the face width be limited to 125 mm with a minimum 10 mm deep tongue with a 2 mm clearance above the tongue and shoulder when installed to allow for possible expansion due to moisture movement. Horizontal tongued and grooved boards should be installed tongue uppermost and the shoulder of the board at the base of the tongue should be chamfered to shed water away from the area of the tongue.

There is a need to ensure that there is sufficient overlap or engagement of tongues to minimise any water penetration. Open jointed systems will always be subject to some water penetration. The thickness of a cladding board should not be less than 25mm at support centres of 600mm and not less than 19 mm at support centres of 400mm or less; the thin edge of the feather-edged board should not be less than 8 mm. End joists in cladding boards should be backed by timber battens.

Indirect wetting, as a result of splashing off the ground or other horizontal surfaces below cladding may result in regular wetting of the lower boards which can lead to deterioration of surface finishes and possible algal growth. Timber cladding should be stopped a minimum of 150mm and preferably 200mm above ground level or abutting roofs to prevent this form of wetting.

If cladding boards exhibit a wide range of colour variation then boards can be sorted by colour and their location in the building planned taking into account factors such as exposure to sunlight and the direction that the wall faces.

Care should be taken that the pressure of cost savings do not result in a reduction of cladding thickness or the use of fixings with a corrosion resistance lower than stainless steel.

It is recommended that fixings be of austenitic (rather than ferritic) stainless steel or a metal with similar corrosion resistance.

Ventilated cavity and battens

A ventilated cavity should always be provided behind the cladding to allow for the drainage of any moisture that penetrates the cladding and to provide sufficient ventilation to dissipate any internally generated vapour. Ventilating the cavity also means that both the external and internal faces of the cladding are exposed to similar ambient humidity and consequently will have similar moisture contents which will reduce the risk of any tendency of the wood to distort due to any variations of the moisture content on opposite faces.

The cavity behind the cladding should be not less than 25 mm wide; however, cavity widths are dependent on:

- The thickness of the batten necessary to fix the cladding boards, i.e. the need to have an adequate nail penetration length for wind suction.
- Exposed locations and buildings with high wind forces may require a wider cavity.
- Some board profiles and wall detailing are more open to the weather than others; these can allow good ventilation of the cavity but may also allow wind-driven rain into the cavity; detailing for water escape and protection of the structure become critical.

Support batten spacing should not exceed 600 mm, whether vertical or horizontal. Limiting the spacing of the support battens will tend to help restrain any natural tendency for the boards to twist, bow or cup.

Horizontal boards only require to be fixed to vertical battens as these will not restrict either drainage or the vertical circulation of air in the cavity.

Vertical boards require to be fixed to horizontal battens with vertical counter battens to their rear. Counter battens of solid wood should be of sufficient thickness to prevent the wood splitting when the battens are nailed through into the studwork or masonry behind. If the horizontal battens are only to be fixed to counter battens, these must be of sufficient thickness to take the fixing nails.

It is important to avoid direct contact between the cladding and porous or wetted non porous surfaces to prevent absorption from these surfaces. This is of particular importance where the end grain of wood is exposed as it is very absorbent. In such circumstances protection can be provided through the use of a damp proof membrane, flashing or a sufficient gap to provide protection. Further protection can be provided if the end grain of the boards is sealed.

Moisture content and movement

WoodSpec: 'A Guide to Designing, Detailing and Specifying Timber in Ireland', recommends a moisture content of 16 +/- 3% for timber cladding boards, while TRADA suggest a similar range 16 +/- 4%.

The drying of cladding boards to a moisture content of 13-19% before installation will restrict moisture movement. Movement can be further reduced by limiting the width of the boards.

Ensure that the moisture content of cladding at the time of fixing is as near as possible to the average in-service moisture content of 16%. This is of particular importance where the boards have been treated with a water-based preservative, as shrinkage and splitting may occur if the boards have been fixed in situ while still at a high moisture content.

Where possible, the heartwood side of the board should be installed to face outwards on the building. This should ensure that the cladding joints will remain tight even if further in-situ drying occurs but some degrees of movement will occur due to seasonality factors throughout the service fife of the building. Different timber species have different movement characteristics which are classified as large, medium and small. Sufficient allowance for movement must be provided in the detailed design of any cladding system.

Cladding boards should be free to move independently of each other to accommodate moisture movement associated with changing environmental condition. Where overlapping occurs, care should be taken to avoid nailing through under-boards. The end-grain of cladding boards should be sealed with an aluminium primer where possible to avoid end-grain splitting.

The natural tendencies of the board to change shape due to moisture content variation should be taken into account. Quartersawn boards have the least risk of changing shape as changes occur in moisture content. Quartersawn boards were specified and used on a number of sites inspected during the survey. For most types of cladding, any boards in which the growth rings run tangentially to the sections should be used with the heartwood facing outwards. For board-on-board cladding, there is an advantage in using the inner board heartwood facing inwards as this will provide better contact between the inner and outer boards.

Detailing

An insect mesh should be provided where necessary to stop an infestation in the cavity behind the cladding.

Battens should be placed to avoid an area from being cut off and becoming unventilated. In addition, where battens are acting as cavity barriers there should not be any gaps that might reduce the ability of the batten to act as a cavity barrier.

Care should be taken that the placing of battens matches the stud spacing of timber frame buildings; battens should always be fixed to the timber framing and not just into sheathing.

Horizontal battens should be chamfered so as to shed water away from the building.

Vertical cladding should be installed with the tongued edge facing into the prevailing wind driven rain direction.

Boards adjacent to the ground should have the bottom edge cut and sloped inwards and upwards to form a drip groove that will shed water away from the building.

Site supervision should take place to ensure that the cladding and battens are placed as the designer envisaged.

Cut ends of battens should be treated with a suitable timber preservative.

I.S. EN 14915 *Solid wood panelling and cladding – Characteristics, evaluation of conformity and marking*

This harmonised standard (i.e. CE marking and a DoP are a requirement) covers cladding for internal and external use.

The standard specifies and defines relevant characteristics and appropriate test methods; in general, it does not lay down specific requirements but requires a manufacturer to declare the claddings essential characteristics so that the cladding can be assessed for its intended end-use.

The standard requires the following characteristics where relevant to be marked (this is not CE marking which is separate) on the product, a label on the product, on the packaging or in accompanying documentation:

1. Reaction to fire
2. Content of pentachlorophenol
3. Release of other dangerous substance
4. Water vapour permeability
5. Thermal conductivity
6. Resistance to fixings

For solid wood cladding reaction to fire is usually taken as that from Table 1 of the annex to Commission Decision 2000/147/EC that is class D-s2,d 2 or D –s2,d 0 further information is given in Table 1 of I.S. EN 14915.

For solid wood cladding, only items 1 and 6 would generally be relevant and perhaps item 3 if the cladding was treated with a preservative by the manufacturer.

Other marking requirements include Formaldehyde class (probably not relevant for external use), biological durability to I.S. EN 350 (not the use class) and in some cases information on the mode of installation (related to fire and sound absorption). A simplified encoding system is also described in the standard.

The CE marking requirements should be placed in a similar manner as that described above. The marking should include;

1. The CE marking symbol;
2. The identification number of the certification body for products under AVCP system 1;
3. The name or identifying mark of the manufacturer;
4. The last two digits of the year in which the marking was first affixed;
5. The number of the EC Certificate of conformity or factory production control certificate (if relevant);
6. The reference to this European Standard i.e. EN 14915:2013;
7. A description of the product: generic name, material, dimensions and intended use, this can be presented as the simplified encoding system in the standard;
8. Information on those relevant essential characteristics listed in Table ZA.1 which can be presented as the simplified encoding system in the standard;
9. For timber treated against biological attack:
   - use class,
   - wood preservative,
   - penetration class,
   - retention class

The essential characteristics (item 8 above) include;

- Reaction to fire
- Release of formaldehyde
- Content of pentachlorophenol
- Release of other dangerous substances
- Water vapour permeability
- Sound absorption
- Thermal resistance (conductivity)
- Resistance to fixings
- Biological risks (durability)

The cladding manufacturer is required to declare at least one essential characteristic in a DoP.

Concluding comments

The use of timber cladding can result in an environmentally friendly covering and provide an attractive appearance to a building. However, care needs to be taken with the cladding and the recommendations and information in this information sheet should help achieve satisfactory performance and appearance in relation to the cladding.

Timber cladding is suitable for a wide range of buildings from home offices and garden sheds to apartments and other large buildings. In larger buildings, the need for maintenance needs to be considered carefully and more attention paid to detailing and long-life cladding and corrosion-resistant fixings become more important.

Modified wood has become more readily available and can offer durable cladding. The Building Research Establishment (BRE) had carried out research on modified wood and the Timber Research and Development Association (TRADA) has carried out research programmes on cladding. Further advice on these activities can be obtained directly from these organisations.

Further sources of information

WoodSpec www.woodspec.ie

COFORD www.coford.ie

Wood Marketing federation www.wood.ie

Wood Preservation Association www.thewpa.org.uk

Timber decking and cladding association www.tdca.org.uk

TRADA www.trada.co.uk

BRE www.bre.com