

CONSERVATION GUIDELINES
TECHNICAL SUPPLEMENT

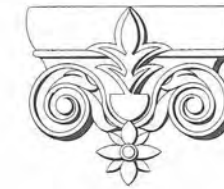


UNDERSTANDING
THE DOORS,
WINDOWS & VENTS

December 1997

SINGAPORE

CONSERVATION GUIDELINES TECHNICAL SUPPLEMENT



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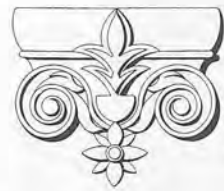
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The doors, windows and vents in conservation buildings give the facades a sense of scale and added architectural expression. When viewed along a street, they contribute greatly to the streetscape. It is, therefore, important that care and sensitivity are exercised when restoring them.

As an existing practice, many of the original doors, windows and vents are replaced during restoration works. This may be due to a lack of awareness of the techniques of evaluation and repair. In the true spirit of conservation, these elements should be retained whenever possible, unless they are eroded versions of the original or their condition is so badly deteriorated that they cannot be salvaged for repair. When properly cleaned, repaired and maintained, the original elements can have their service lives greatly extended.

This leaflet outlines some of the methods through which quality restoration of the original doors, windows and vents can be achieved. It will also highlight how these traditional elements can be adapted to serve modern functional purposes.



INTRODUCTION



Fig 1: Shophouse facades showing the different typologies.



A careful evaluation of the existing physical conditions of the doors, windows and vents is necessary to determine which of the original elements are sound enough to be retained. (See Fig 2 and 3)

Many factors such as poor detailing, moisture, vandalism, insect attack and lack of maintenance can contribute to the deterioration of these elements. The following are suggested issues to check:



ASSESSMENT

Fig 2: Existing condition of original timber casement window still in relatively good condition.



Fig 3: Eroded door panels on site. The rail and stile panels on the left should be replaced with matching timber panelled doors during restoration.

a. Moisture

Moisture is generally the primary contributing factor in timber decay. The inspection should check for water entering around the edges of the frames and, if so, the joints should be caulked to eliminate this danger. Any conditions, including poor original detailing, which permit water to come into contact with the wood must be corrected.

Since excessive moisture is detrimental to the paint bond, areas of paint blistering, cracking, flaking and peeling usually identify points of water penetration, moisture saturation and potential deterioration. Failure of the paint, however, should not be mistakenly interpreted as a sign that the wood is in poor condition. Quite often, the timber is

frequently in sound physical condition beneath the unsightly paint.

b. Operational Soundness

Besides checking for water penetration, each element should be examined for operational soundness. Severe deterioration is usually apparent on visual inspection (See Fig 4) and by knocking. Other less severely deteriorated timber areas may be tested by jabbing a small probe into a wet timber surface at an angle and prying up a small section of the timber. Sound wood will separate in long fibrous splinters, but decayed timber will lift up in short irregular pieces as a result of the breakdown of the fiber strength.


Fig 4: Badly decayed timber door frame.



Another method is to push a small probe into the timber, perpendicular to the surface. If the core is badly decayed, the pressure of the probe will force it through the apparently sound skin.

c. Insect Attack and Fungi

All existing decay due to insect attack or fungi should be arrested using preservatives or fungicides to stop the deterioration process.



RETENTION
AND
RESTORATION

Cleaning

a. Removal of Environmental Grime and Organic Matter

All timber surfaces should be thoroughly cleaned before painting is carried out. The surface deposits prevent proper adhesion and can cause peeling. Abrasive cleaning is not recommended as this will change the exposed timber texture and hence adversely affect the historical integrity of the building. The gentlest method of removing environmental grime and organic matter is to use a water wash or steam cleaning, scrubbing areas of persistent grime with a natural bristle brush.

b. Removal of Mildew

Mildew is caused by fungi feeding on nutrients contained in the paint film or on surface dirt. Any shady, warm, moist areas conducive to its growth should be eliminated. To remove mildew, scrub the surface with a medium soft brush in a solution of non-ammoniated detergent, household bleach and water. The surface should then be rinsed with water and allowed to dry thoroughly. When repainting, specially formulated "mildew-resistant" primer and finish coats should be used.

c. Removal of Stains

Staining can be due to rust or natural extracts from timber. The source of the stain has to be located and the moisture problem corrected. Rusty metal anchorage should be hand sanded and coated with a rust-inhibitive primer followed by finish coats. Exposed nail heads should be countersunk, spot primed and the holes filled with a high quality timber filler. Discolouration due to colour extractives from timber can be cleaned with a solution of denatured alcohol and water. After the affected area has been rinsed and dried, a primer should be applied.

Removal of Paints

Removing paint from conservation buildings, with the exception of cleaning, light scraping and hand sanding as part of routine maintenance, should be avoided unless absolutely essential. There are several safe and effective techniques for removing paint from wood, depending on the amount of paint to be removed. The methods listed below are in order of preference.

a. Chemical

Softening of the paint layers with chemical strippers followed by scraping and sanding. This can also be used for total paint removal.

b. Abrasive

"Abrading" the painted surface by manual or mechanical means such as scraping and sanding. Generally, this is used for surface preparation and limited paint removal. (See Fig 5)

Fig 5: Scraping off the painted surface of the panelled shutters.



c. Thermal

Softening and raising the paint layers by applying heat followed by scraping and sanding. Generally, this is used for total paint removal. (See Fig 6)

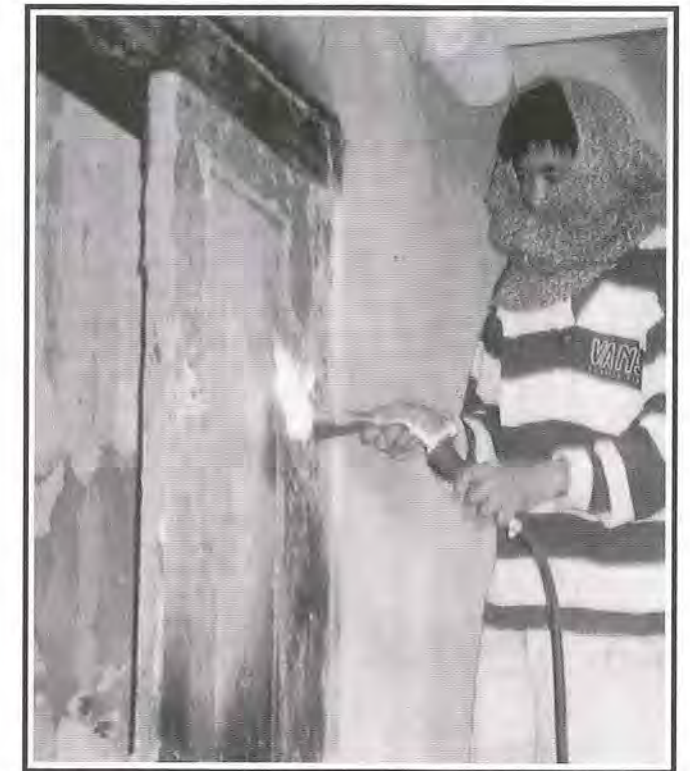


Fig 6: Using a hot-air gun to remove the old layer of paint from a timber panelled casement window.

Lead-based paints will detach from the wood with gentle heat from a hot-air gun while oil-based paints like enamel paints can be easily removed with a chemical stripper such as turpentine. If heat treatment is used, any glass should be removed or protected from the sudden temperature change which can cause breakage. It is important to protect the glass because it may have been made using older glass-making techniques, providing additional character to the elements.

Repainting

If existing paint conditions show no evidence of paint deterioration such as blistering, peeling or cracking, there is no physical reason to repaint, much less to remove paint.

Extra coats of paint may trigger cracking and peeling at the weakest point of adhesion — the oldest layers next to the timber. This is due to the excessively thick paint being less able to withstand the shrinkage or pull of an additional coat as it dries and being less tolerable to thermal stress.

Exterior paint is constantly deteriorating through weathering but in ideal conditions, the surfaces can be cleaned, lightly scraped and hand sanded in preparation for a new finish coat. The

recommended type of external paint for timber is synthetic enamel paint. (See Fig 7)

Previously applied paint can be easily stripped due to the fairly sturdy joinery. Removal of excessive layers of peeling and flaking paint will facilitate operation of the doors and windows, and restore the clarity of the original detailing. Some degree of paint removal is also necessary as the first step in the proper surface preparation for subsequent refinishing. However, the general approach should be to remove paint to the next sound layer using the gentlest means possible, and then proceed with the repainting.

Fig 7: Preparing the surfaces of a timber louvred window.



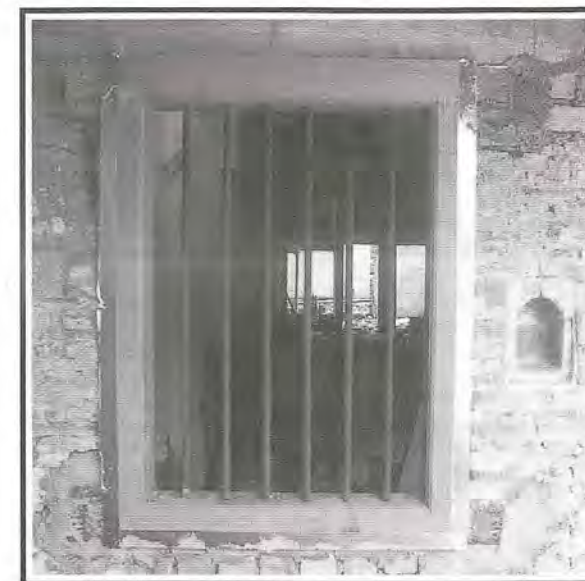
Strengthening

Timber can be strengthened and stabilised by consolidation, using epoxy resins which saturate the porous decayed timber and then harden. The surface of the consolidated timber can then be filled with an epoxy resin compound, sanded and painted. Painting is essential as untreated timber often warps in high humidity.

Epoxy patching compounds can also be used to build up small sections of the missing sections or decayed ends of members. Generally, epoxy materials are comparatively expensive, but they are the most durable material for timber repair.

Wherever possible, any repair to woodwork should be carried out using traditional carpentry methods, retaining all sound existing materials and replacing only what is necessary in order to restore the integrity of the frame. Badly damaged or seriously split members or parts of members should be cut away and new sections spliced on, using timber derived from the same tree species.

Fig 8: A 'strengthened' casement window frame.





REPLACEMENT

Although the retention of the original elements is always desirable and encouraged, there comes a point when the condition of the element may indicate the need for replacement. The decision in selecting replacement door, window or vent should be based on how similar the new element is to the original design, proportion, material and detailing, and not on what is available in the market.

Choice of Material

When replacing these old elements, the original materials are preferred. The traditional types of timber used in doors and windows are usually balau, chengal and kapur.

Treatment of New Timber

New timber has to be properly treated before use. The recommended method of treating timber in Singapore's hot and humid weather is pressure impregnation with preservatives. This is now done in the factory before the timber is delivered to site.

Detailing

Any new detailing should always follow the original ones. Refer to the sample drawings of original door, window and French window details. (See Fig 9,10 and 11)

Fig 9: Elevation, Section and Plan of a typical door detail and an example of the restored element.

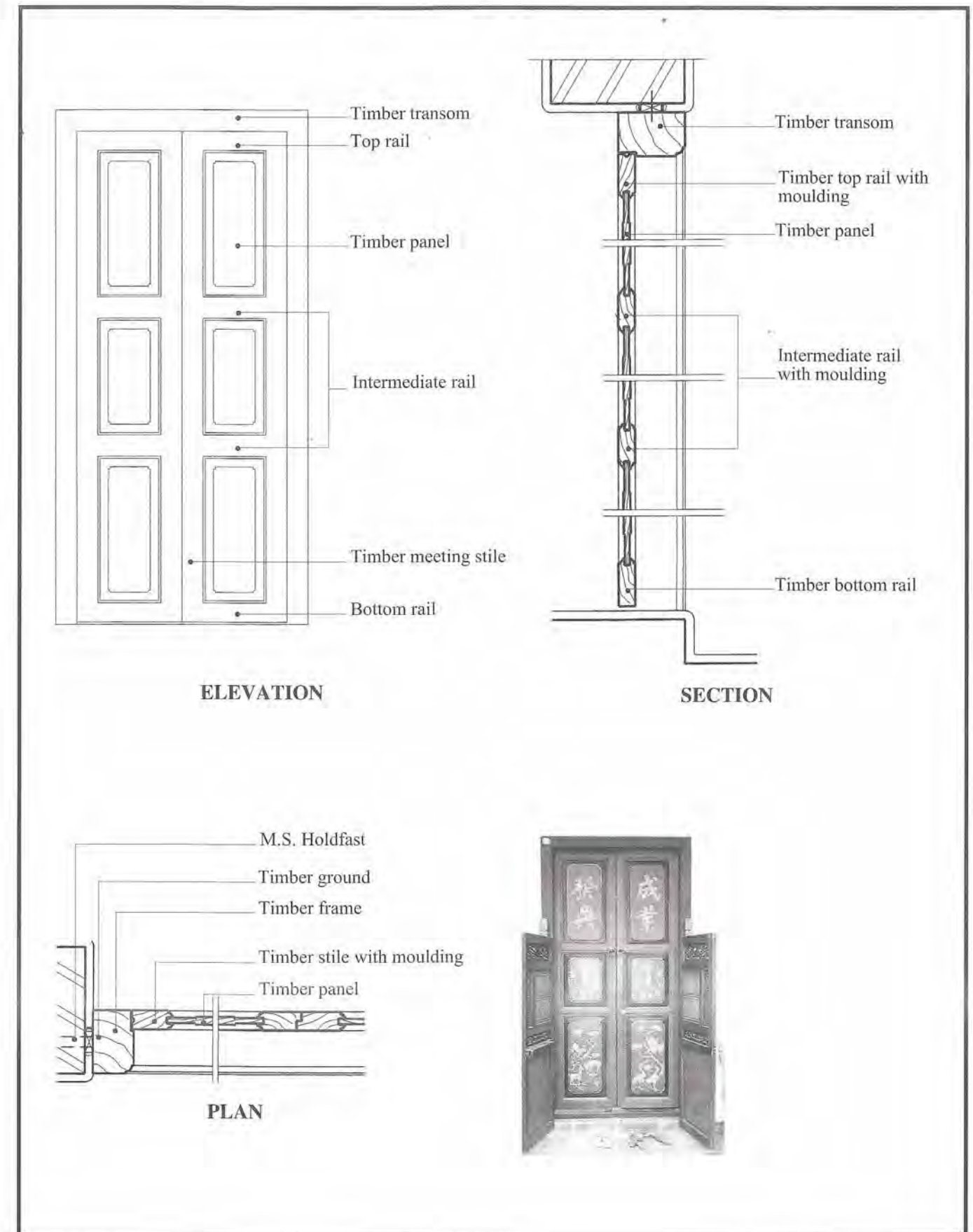


Fig 10: Elevation, Section and Plan of a typical French window detail and an example of the restored element.

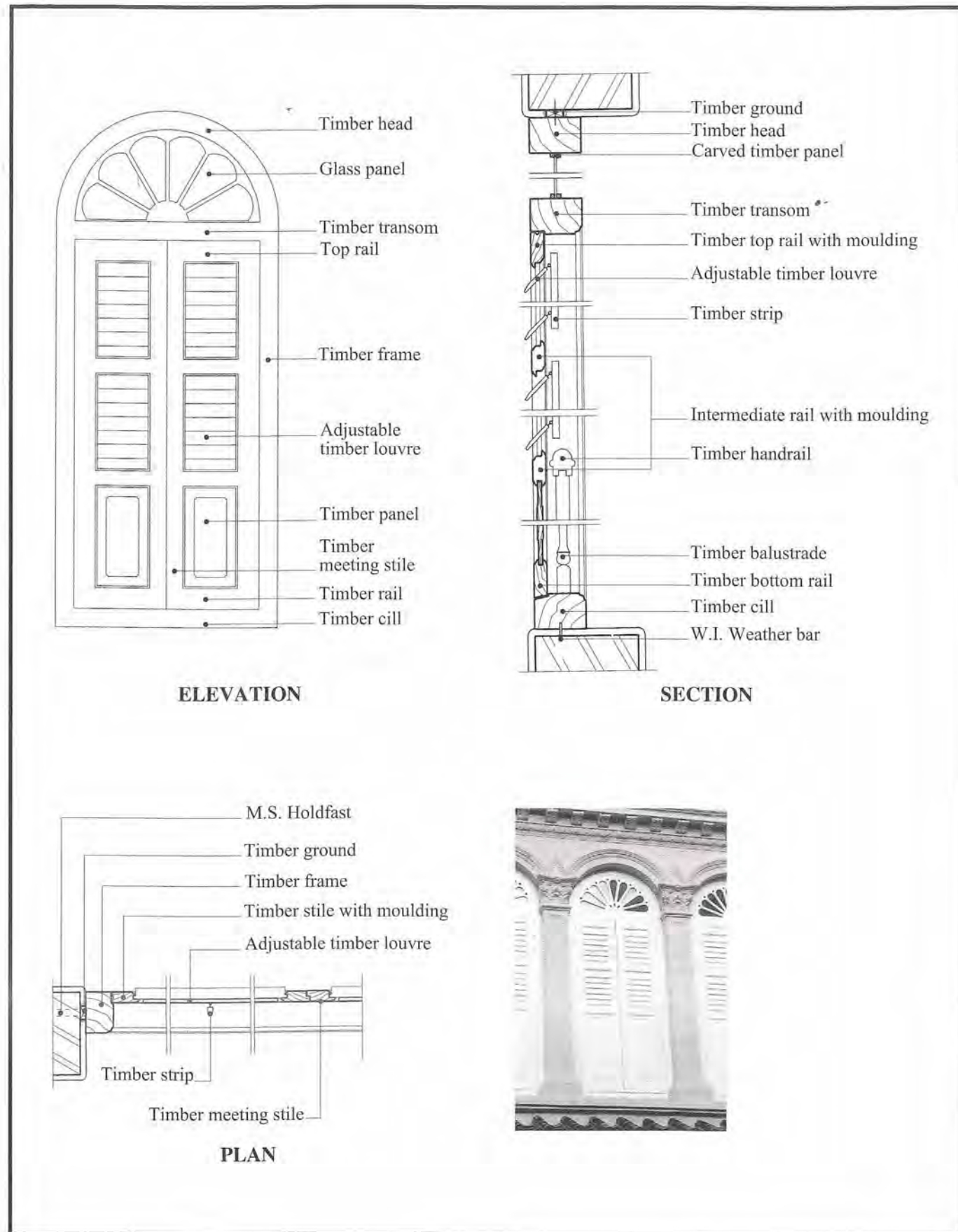
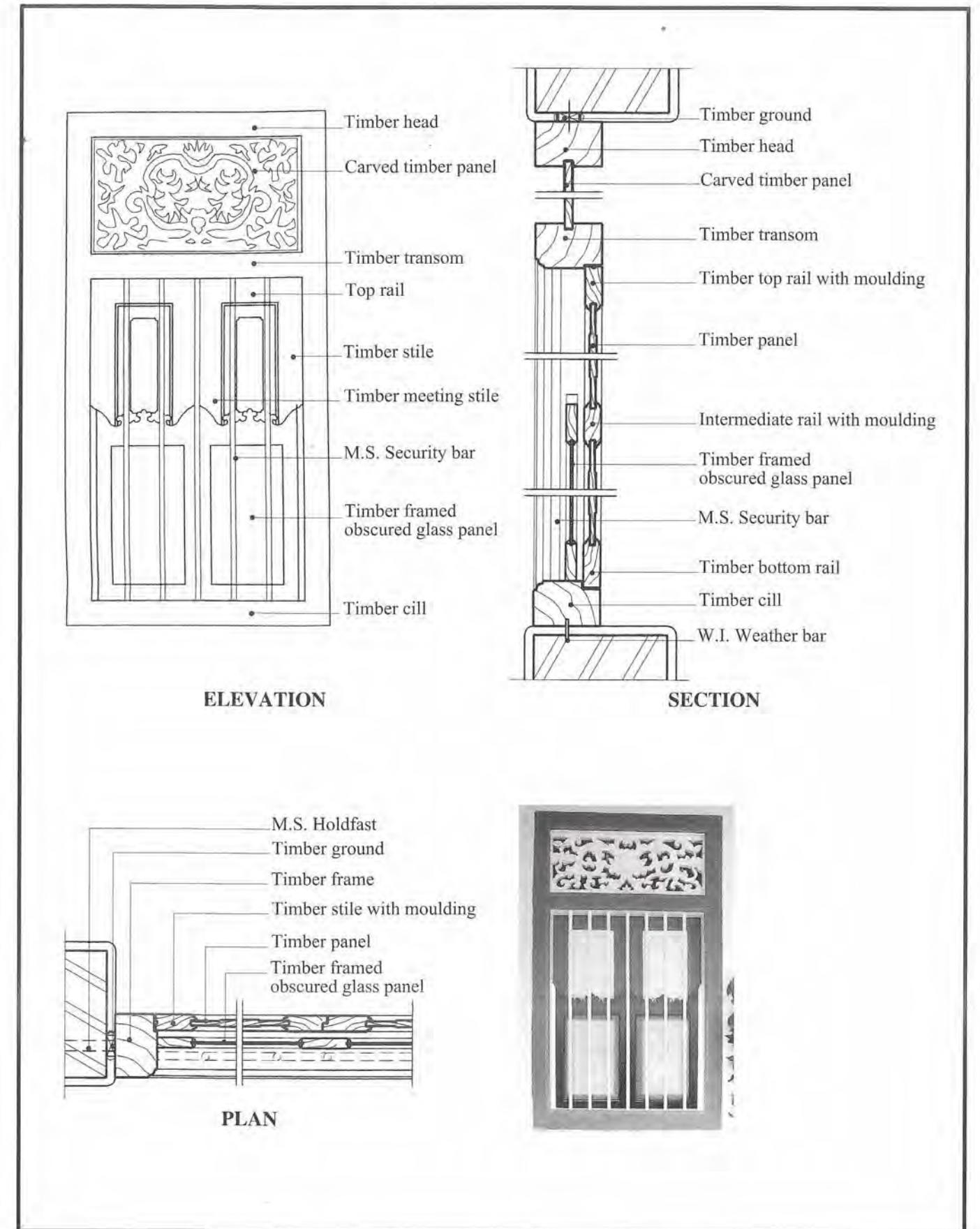


Fig 11: Elevation, Section and Plan of a typical casement window detail and an example of the restored element.



Painting

Although painting is a temporary physical shield that requires a re-application every few years, it excludes moisture penetration to a certain degree, thereby slowing timber deterioration. (Refer to section on “Repainting”) Another important purpose for painting the timber is to define and accentuate the architectural features and to improve appearance. (See Fig 12) This aspect is left to the creativity of the architects and preference of the owners / developers.



Fig 12a: Before restoration



Fig 12b: After restoration
Repainting to define and accentuate the French windows and architectural features.





ADAPTATION

Upon restoration, many traditional buildings are installed with air-conditioning to meet modern standards of comfort and demands of new users. Often, secondary windows are introduced behind the original windows to accommodate this change. However, as both frames have to be accommodated within the thickness of the existing wall, the original windows are often not set back according to the original detailing. The traditional fenestration profile is thus altered to accommodate adaptive reuse. (See Fig 13 and 14)

Fig 13: New secondary windows installed between the m.s. security bar and the original timber panel casement windows at 1st storey front facade.

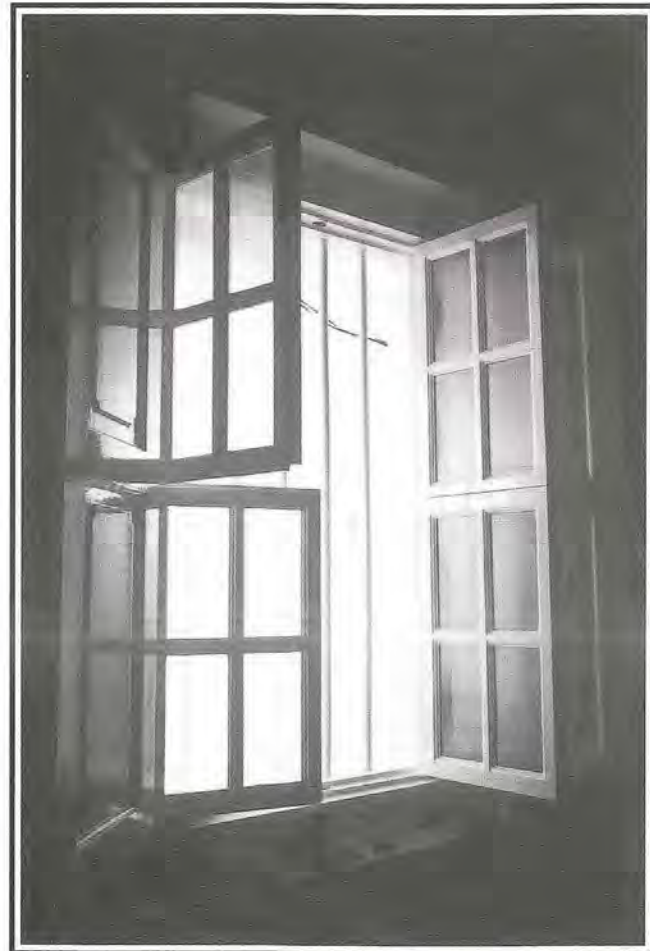


Fig-14: Plan and section illustrating the construction detail of the new secondary window as shown in Fig 13.

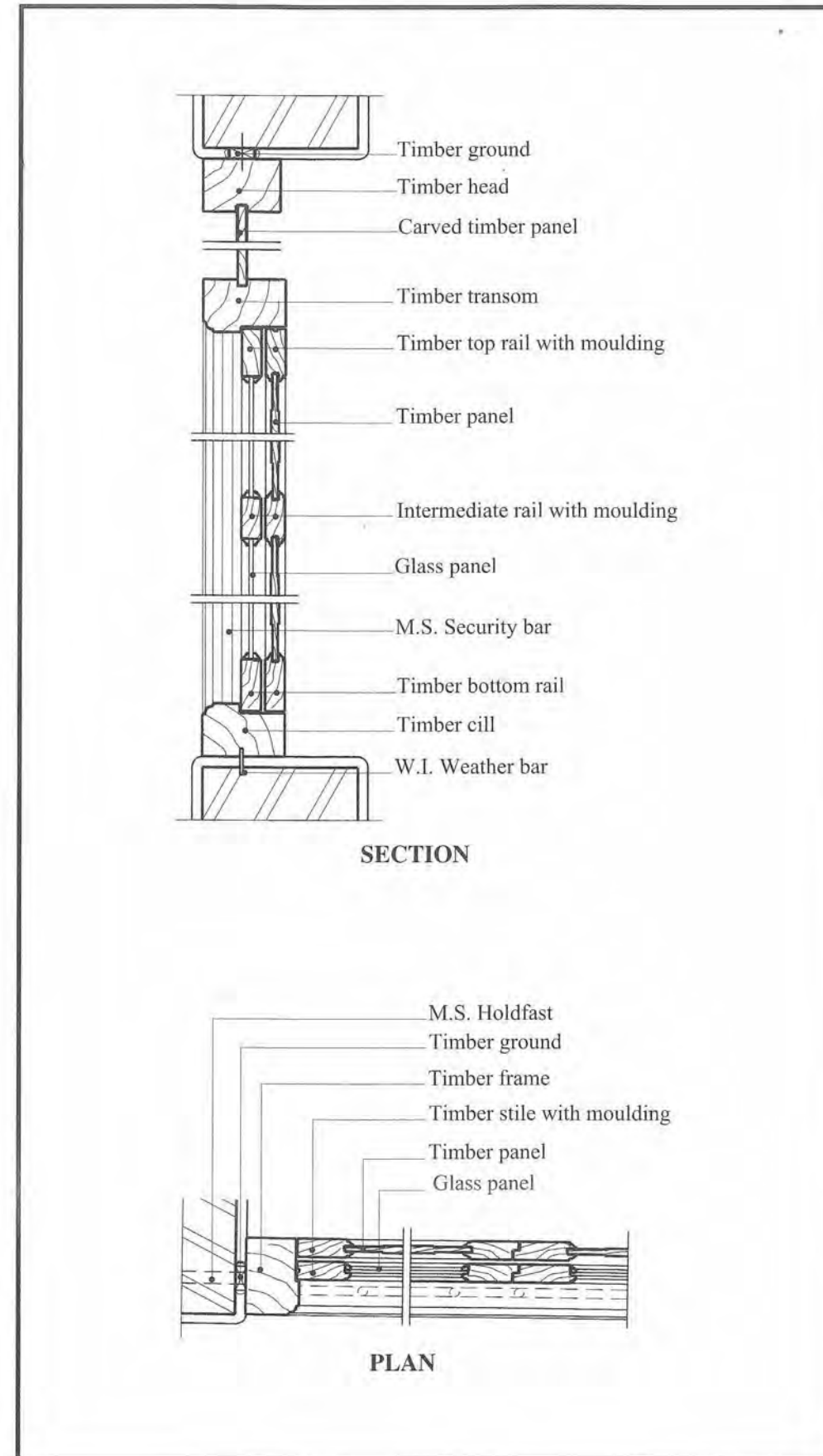
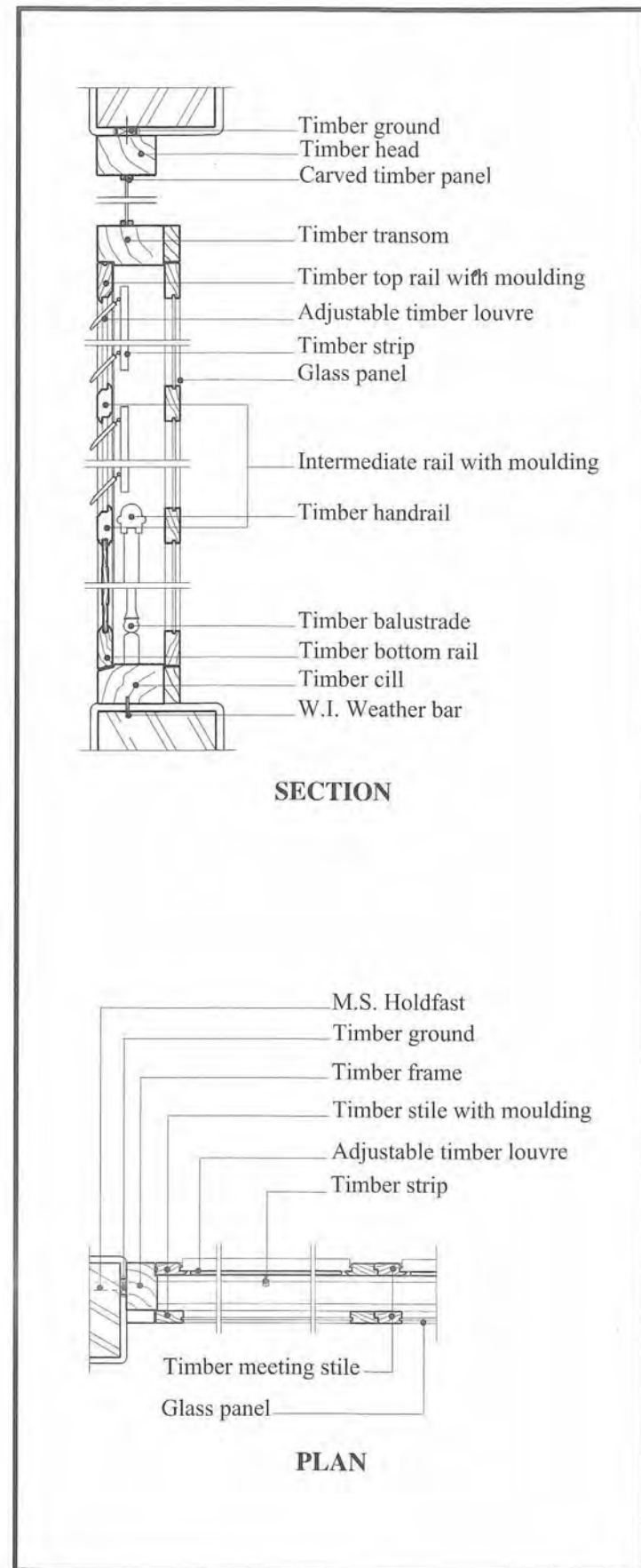




Fig 15: Intermediate rails of secondary windows matching those of the original casement and French windows.



Fig 16: Plan and section illustrating the construction detail of the new secondary French window as shown in Fig 15.

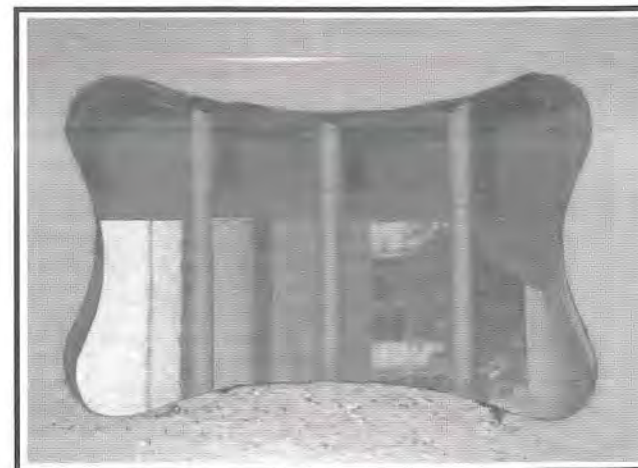


Although the infill design of secondary doors and windows is allowed to vary, the architect should ensure that the new design is sensitive to the original; the intermediate rails of the 2 sets of elements should match. (See Fig 15 and 16)

* Traditional ventilation openings in bat-shaped form (with or without iron bars), circular or precast concrete vents should also be sensitively sealed up with glass using backing rods and sealant, if required. Such an adaptation does not destroy the original profile and appearance but ensures water tightness. (See Fig 17)



Fig 17
Top: External view of bat-shaped vent.
Bottom: Internal view of the vent with glass infill to adapt to modern air-conditioning.





MAINTENANCE

The general maintenance of the restored doors, windows and vents would include the following:

1. appropriate surface treatments on a cyclical basis to provide adequate protection such as cleaning, rust removal and re-application of protective coatings
2. periodic examination to ensure that there are no causes for deterioration due to water accumulation at the joints of the frames or termite infestation.

The termite resistant coating added to the timber elements has to be checked regularly to determine whether repainting is necessary. If an infestation has already taken place, efforts should be quickly made to localise the problem and repair the affected parts. Early treatment would reduce the potential need for replacement.



Existing elements when well-maintained reduces the need for total replacement. Regular thorough maintenance will prolong the service lives of the doors, windows and vents which have been pains-takingly restored.



The retention and repair of the original doors, windows and vents are recommended wherever possible because these are major elements contributing to the urban texture of the conservation area. The restoration process is more practical than most people realize. It is, therefore, unfortunate that many of the traditional elements have been replaced due to a lack of awareness of techniques for evaluation and repair. These elements, when repaired and properly maintained, continue to service the buildings while retaining their historic character.



CONCLUSION

Fig 18: Restored timber panelled entrance door with decorative pintu pagar.



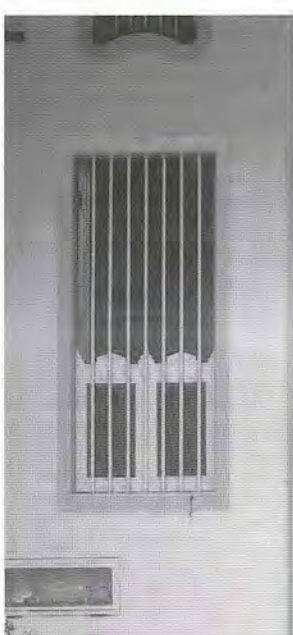
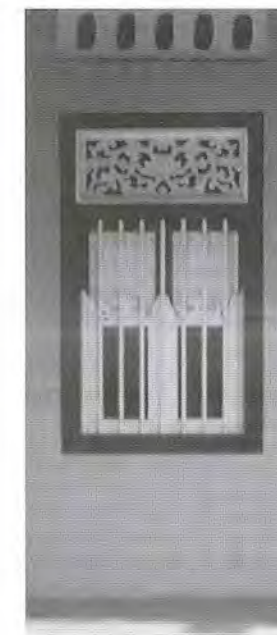
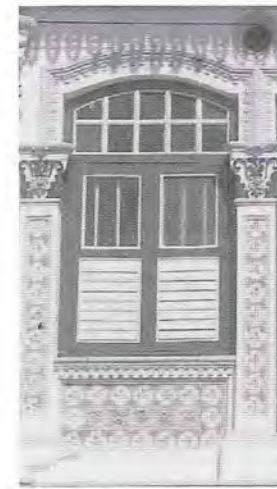
Fig 19: Careful restoration of the timber doors, French windows and casement windows enhances the overall character of the conservation shophouses.



There are five shophouse facade styles: Early, First Transitional, Late, Second Transitional, and Art Deco. The five styles are roughly in chronological order with some overlapping and are the result of changing economy, technology, taste and fashion. Although the doors remained largely unchanged, the windows and vents evolved through the different styles.



APPENDIX





Early Shophouse Style (1840 - 1900)

"First generation" of shophouses where the rectangular doors and windows are shutters of boards, panels or louvres. Transoms are rare but there may be vents between or above doors or windows. The vents are usually unfilled but if large enough are backed with mesh.

Cornices along the beams make the structure appear heavy. The usual orders adopted are the Tuscan and Doric. Ornamentation is minimal but if used, usually derived from ethnic sources, reflective of the immigrants who built them.



First Transitional Shophouse Style (Early 1900s)

A general lightening of expression compared to the Early Shophouse Style. There is a preference for more vertical proportions and the solid-to-void ratio of the facade composition is approximately 1:1. Most of the shophouses of this style have an elevation which features two windows.

Transom designs are more varied and are infilled with glass, cast iron or worked timber panels. Vents are simple squares. The use of modified Corinthian or Composite Order is common but generally there is a relatively restrained use of ornament.





Late Shophouse Style (1900 - 1940)

The best known of all the shophouse styles due to its beautiful ornamentation. A tripartite facade arrangement is most common. This reduces the actual wall space to a minimum. Often, the "wall" surface is replaced by columns or pilasters framing the windows.

Ornamentation becomes increasingly eclectic and sometimes, the facade is so densely covered with plaster and tile ornamentation that it is as if the whole surface is alive with movement. The Corinthian and Composite Orders were favoured as these are the most ornamental.

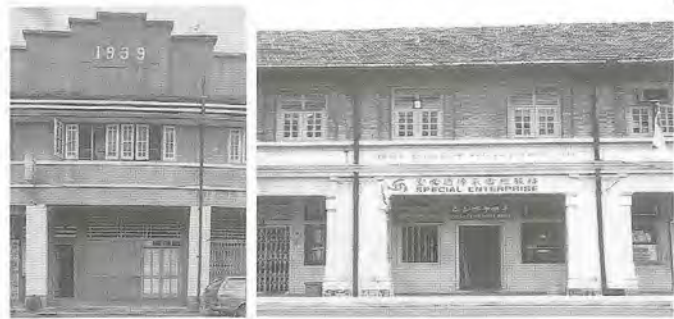


Second Transitional Shophouse Style (Late 1930s)

This style is distinguished by simplified designs which reflect the changing trends in Europe where the Art Deco period had by 1910-1920 replaced the Art Nouveau movement.

Typical Second Transitional Shophouse combine the Late Shophouse Style motifs with Art Deco elements of simple geometric designs.





Art Deco Shophouse Style (1930 - 1960)

This style is typified by the streamlining of Classical motifs into geometric designs. Decorative wall tiles are also rarely used. Emphasis is placed on proportional beauty and elevational composition. Another feature is the appearance of date-bearing plates on the buildings. This is certainly helpful in determining the period of any particular building.

