Timber for Furniture – *Its Limit is Your Imagination*

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INTRODUCTION

When we think of furniture, our minds will most likely turn to timber furniture. This is because timber is the most common material for the manufacture of furniture. What makes timber the material of choice is its workability and the large variety of species available. However, not many people really understand timber, certainly not to the point where we can bravely experiment with the material. Most people will stick to the few proven species that have been around for a long time. This has a side-effect in that the customers will eventually get tired of the same old material and style. That's why, as budding designers, you have to understand the material to a point where you are comfortable to experiment and let your imagination soar.

The talk today is to give you a glimpse of what timber is all about and what to look for when you wish to use timber for furniture manufacture.

NATURE OF TIMBER

The uniqueness of timber comes from the fact that it is a biological material and therefore is subject to environmental influence during its formation and development. This makes timber variable, *e.g.,* variable densities and technical properties. In other words, no two pieces of timber are similar, even if the two pieces come from the same tree. This creates a lot of confusion among users and failing to grasp this fact has led to many mistakes in the utilisation of timber.

However, once we understand the intrinsic characteristics of the material, timber can be a most accommodating material, offering almost unlimited variety in form and colour. As mentioned above, wood is not a synthetic material, where the properties can be defined through formulations during manufacture. This makes wood difficult to handle as the variations in properties has to be considered. In order to understand the behaviour of wood, a few fundamental characteristics of wood must be kept in mind.

Wood is a biological material

As a biological material, wood is made up of cells. These cells are elongated and are arranged along the longitudinal axis of the tree. The cells themselves are made up a

complicated mixture of polymers of cellulose, non-cellulosic carbohydrates, and lignin. These cells and the way they are arranged impart outstanding physical and mechanical properties to the wood. The down-side to being a biological material is that its formation is heavily influenced by the environment. Unlike steel and concrete, where the properties are predictable, the properties of wood exhibit a large variation. Wood cut from the same tree often exhibit differences in physical and mechanical properties. This is because of the environmental factors that influence the development of wood in the tree. For example, one side of the tree may get more sunlight than the other side (this can happen especially in the temperate regions where the sun is seldom overhead and only rise and set just above the horizon). The side that gets more sunlight will grow faster than the side that is shaded. Faster growth means bigger cells with thinner cell walls, while slower growth will produce smaller cells with thicker walls. Timber with thick-walled cells is generally stronger than that which contains thin-walled cells. These variations must be given due considerations during utilisation.

Wood is anisotropic

The cells that make up wood are elongated and are arranged along the longitudinal axis of the tree. Due to this arrangement of the cells, wood will exhibit different appearances if cut in different directions. This is an important consideration when selecting timbers for their appearance.

Wood is hygroscopic

Due to its fibrous make-up, wood is subject to changes in the moisture content of its surroundings. Wood will absorb water if the surrounding has a higher moisture content, and conversely will give up its moisture content if it is wetter than the surroundings. These absorption and loss of water will cause the wood to swell or shrink. Furthermore, the anisotropic nature of wood will cause unequal dimensional movement in the three axes.

The dimensional movement of wood is one of the most serious considerations that must be catered for in using wood for making furniture. To eliminate excessive movement during its service life, the moisture content of the wood must match the moisture content of the surroundings.

Wood is biodegradable

Being a biological material, wood is subject to attacks by biodeteriorating agents, such as fungi and insects. Since wood is essentially made up of cellulosic material, anything that can digest cellulose can attack it. Furthermore, most wood cells contain a certain amount of sugars and starch, which is a rich food source for both fungi and insects.

DESIRABLE PROPERTIES FOR FURNITURE MAKING

With a good understanding of the nature of timber, it is possible to utilise this material properly in any furniture design. Timber has proven itself to be the most versatile material for the manufacture of furniture. This is because timber has a number of positive attributes that no other material can duplicate. Among the positive attributes of timber are:-

Working properties

First and foremost, the material chosen for furniture must be easily worked. Among the many species of timbers, there are a large number them that have good working properties.

Colour

Colour plays an important part in any design. Choosing the right colour is relatively easy as timber offers a wide range of colours and shades. There are timbers that are almost pure white, while some are deep red and others that range from yellow to brown.

Figure

Some timbers exhibit some distinct patterns that are very attractive. These patterns are technically called figure, and they can appear as streaks of colour, patches of different colours or lustrous strips. Timbers with attractive figure can be used to improve the design of any piece of furniture.

Grain

Due to the cellular make-up of timber, it has a grainy look. This grain can appear differently in different direction. Further, the grain can show differences when the piece of timber is cut in different direction.

Some timbers have very fine grain and is suitable for furniture making, while some timbers have coarse grains, which require extra work in filling and finishing.

Dimensional stability

In furniture making, dimensional stability is an important consideration. Excessive movement of the timber will result in furniture that is unstable. Due to its hygroscopic nature, all timber will move to a certain extent. The trick is to season the timber to match the moisture-content of the service environment. For example, for outdoor furniture, the moisture-content need not be very low, as the furniture is expected to be exposed to the rain. On the other hand, timbers for bedroom sets, which are expected to be installed in an air-condition environment must be dried down to at least 10% moisture-content during manufacture.

Durability

Timbers vary in their natural durability. Some timbers are naturally durable, while some timbers are very susceptible to attacks by fungi and insects. These non-durable timbers may need chemical treatment to prevent such attacks. Timbers such as Rubberwood will be attacked by staining fungi almost immediately after they are felled. The normal procedure is to dip the freshly sawn timber in a solution of borax compound to provide the protection.

Timbers for outdoor furniture require a certain amount of durability, as the furniture will be exposed to the elements.

CHOOSING TIMBERS FOR FURNITURE

There are several considerations that have to be taken into account when we set out to design and manufacture furniture. Aside from the actual form that the design will eventually take, the materials that go into the design is also an important consideration.

Let us say that we have decided to use timber in the design, what then are the factors that need to be considered? By having a deeper understanding of the nature and behaviour of timber we can make some enlightened choices. Listed below are some points that must be considered when using timber.

Working properties

The timber chosen must have good working properties, otherwise there will be extra work involved during the manufacturing process. Extra heavy timbers tend to be hard to work, so unless we are designing for heavy-duty furniture like industrial benches, we should avoid using heavy timbers.

However, this whole point can be mitigated if the timber has other outstanding properties. An example is Ebony, which is a heavy timber and difficult to work, but its beautiful solid black colour makes up for the extra work that has to into the manufacture of Ebony furniture.

Colour

Colour is an important element in any design. Choosing the timber with the desired colour is perhaps one of the first decisions that must be made.

It is fortunate that timbers offer a wide range of colours and shades to choose from. Colour in timber can be white to yellow, light to dark brown, all shades of red, and even some show tinges of green.

Figure

In most mass-produced furniture, figured timbers are not generally used. This is because the supply of figured timbers is limited and uncertain. However, if available, figure in timber can enhance the design of the piece. Timbers with outstanding figures include Rosewood, Oak, Teak, and Padauk. Local timbers that have some form of figure include Dark Red Meranti (stripe figure), Sepetir (streaky figure), Nyatoh (stripe figure), Kembang Semangkok (oak-like figure), and Rengas (streaky figure).

Grain

In designing, we can take advantage of the grain in a piece of timber to enhance the design. Due to the anisotropic nature of timber, the grain can vary depending on which direction the piece of timber is cut. Some timbers show an attractive grain if cut in the right direction.

Dimensional stability

Dimensional stability is very important in a piece of furniture. Excessive movement of the timber during service will cause table legs to fall off and chairs to collapse.

Some timbers move more than others, therefore, when choosing timbers for furniture, avoid those with excessive movement. However, the most common cause of dimensional movement in a piece of timber is the unequal moisture-content between it and the surrounding atmosphere. In order to avoid excessive movement, the moisture-content of the timber must match the ambient moisture-content. For example, if the furniture is destined for use in temperate countries where during winter, the ambient moisture can drop to below 8%, the timber must be dried to around 8-10%. On the other hand, if the furniture is to be exposed to rain and shine, such as garden furniture, the moisture-content of the timber can be as high as 20%. The common way to achieve a low moisture-content is to kiln-dry the timber before manufacture.

Mix and match

Furniture design can take advantage of the wide range of choices that timber offers. For example a clever mix of species of different colours will enhance the design.

There is a possibility of mixing timber with other materials, such as glass, ceramics, or aluminium into the design to achieve a unique look.

WHAT IS OUT THERE

So what are the timbers available for the manufacture of furniture? Taking into account of the desirable attributes that a timber should have as a material for furniture, we have narrowed down the range of species available.

In Malaysia, most furniture is made from Rubberwood. This is because there is a constant supply of this material. The fact that Rubberwood is the mainstay for the furniture industry does not mean that there are no other suitable timbers for furniture. The following, both local and foreign timbers are possible candidates.

Nyatoh

This is a red coloured timber, which is easy to work and has a beautiful stripe figure. It has fine grains and often shows a sheen when finished properly.

Sepetir

This is a light golden brown timber with dark brown streaks. Selected pieces can be very streaky.

Dark Red Meranti

As the name suggests, this is a red timber. It has stripe figure and is easily worked. However, it has a large dimensional movement and care must be taken to dry it properly before use.

Kembang Semangkok

This is a yellow to light brown timber with attractive oak-like figure.

Damar Minyak

This is a conifer that is normally found in the higher altitudes. It is related to the kauri of Australia and New Zealand. It has a fine texture and occasionally shows a silky sheen. However, it is soft and tends to dent easily.

Merbau

This is a dark brown timber with fine grains. It has a growth-ring figure that is very attractive. It is one of the most stable timber found in Malaysia with very little dimensional movement. However, it has become very expensive due to demand as a high class flooring material.

Rengas

This timber has a dark red core that is streaked with blood red or black streaks. It is a fine grained timber with a smooth finish. However, the sap of this tree and the moisture from the wood can cause severe skin irritation. The dried timber is harmless.

Bintangor

This is a reddish timber with rather coarse grains. It is easy to work, however, due its coarse grains, extra work must be done to obtain a smooth finish.

Acacia

This is a plantation-grown species which is now freely available. It was introduced from Australia and has been found to grow quickly under Malaysian conditions.

It is a golden-brown to dark brown timber with occasional streaks of darker material. It has been used for making outdoor furniture.

Cherry

This is northern temperate timber often imported into this country for high class furniture. It is a reddish timber with a very clear defined stripe figure. It is fine-textured and finishes well.

Oak

There are two groups of Oak, *viz.*, the White Oak and the Red Oak. White Oak is more popular due to its stability, while Red Oak is harder to handle as it tends to crack upon drying.

Oaks are famous for their oak-like figure where the large rays appear as patches in the wood.

Oaks can come from either Europe or the USA.

Walnut

This is dark chocolate-brown to purplish-black timber imported from USA or Europe. It is one of the outstanding decorative woods in the world, long prized for fine cabinet work.

Sapele

This is an African timber. It is red in colour with very distinct stripe figure. Looks very much like the local Dark Red Meranti.

Rosewood

This is perhaps one of the most well-known timbers in the world. Rosewood furniture is a class by itself but the lower grade timber can be used to mix-and-match with other timbers to provide some attractive designs.

Most Rosewood comes from China in the old days but recently, the supply tends to come from Vietnam or Cambodia.

Teak

This is also a well known timber that is found in the Thailand-Myanmar area, although many countries are producing plantation-grown Teak. The Teak from the natural forests tends to be deeper in colour and closer grained. Plantation Teak is usually pale golden brown in colour with the growth rings far apart.

CONCLUSION

Timber indeed offers almost unlimited options to any designer who is interested in using this material for the design of furniture. The wide selection of species that covers the wide range of colours and shades can be likened to a huge palette of paint, just waiting for some imaginative input to create the design of your dream.

With a deeper understanding of the behaviour of timber, it is possible to use the material more judiciously and efficiently. Remember – *for timber, its limit is your imagination*.