

Coachbuilding Timber Selection

By John Merton

Background

Coachbuilding, in shorthand, is the practice of making a vehicle body by applying metal (or other) panelling to a wooden frame. Morgans have nearly always had a coachbuilt body, and it has been both the delight and despair of generations of owners. The despair comes principally from the nature and type of framing timber used.

Desirable properties for a framing timber are strength, resilience/recovery, toughness, flexibility, and impact resistance. The timber traditionally used, indeed since Roman times, in European coachbuilding is the European Ash (*Fraxinus excelsior*), although reportedly some expensive bodies have been framed in mahogany. In the USA, claimed framing timbers have included American white ash (*Fraxinus americanus*), closely related in characteristics and performance to European ash, spruce, hickory, and white oak, although coachbuilding went into considerable decline after the late 1920's as manufacturers moved to all steel body construction pioneered by Budd.

In Australia before World War 11 there was a significant coachbuilding trade the length and breadth of the country, mainly using locally-sourced indigenous hardwoods. Most cars were locally bodied on imported chassis.

The Despair

Despite the somewhat extravagant claims sometimes made for European ash, its performance is by no means outstanding, while its ability to resist racking (the tendency for the timber to compress under repeated movement, leading, for example to loose joints) is poor and its susceptibility to rot is legendary. A UK restoration specialist once said to me in an unguarded moment "It's a lovely timber to work, but it's the most rottingest timber known to man". The British Handbook of Hardwoods (HMSO 1980)states, in relation to use of this timber in road vehicles, that it should be used with care on account of its lack of natural durability.

The problem was recognised in the hey-day of British coachbuilding, one practice being to use oak instead of ash for the sillboards (those on the chassis rails) because of its superior durability, despite its propensity to split. Since the mid-1980's the Morgan Company has been soaking its body frames in a copper naphthalene solution to improve durability. However, be warned such treatment only has a finite life.

The real reason European ash is used as a framing timber is because the trees are widely dispersed across Europe, the timber is in good supply, and it has good working properties. However, in fairness, it must be said that in terms of flexibility, impact resistance and so on, there are few if any available indigenous substitutes in Europe.

Better local timbers

When I first developed an interest in coachbuilding in the early 1960's, there were still a few old-style coachbuilders around, and local libraries still had some technical training manuals on the subject. The advice from both areas was that Australian timbers constituted the half dozen best coachbuilding timbers in the world at the very least. The preferred timber was spotted gum, closely followed by blue gum then some other Eucalypt species and coachwood (*Ceropetalum apetalum*).

Some old anecdotal evidence, from both the vehicle and boatbuilding industries, supports this. I have been told that the framework on the small numbers of completely built up expensive vehicles imported before the War generally failed to match, in either performance or durability, their Australian-bodied counterparts. Also, boat restorers on the Murray River have told me that imported wooden hulled vessels for the river trade in the 19th and early 20th centuries often lasted as little as 3 to 5 years whereas some Australian timbered hulls are still basically sound today.

The contention is backed further by performance data.

Performance Data

SPECIES	Modulus of Elasticity (gpa)	Modulus of Rupture (mpa)	Maximum Crushing Strength (mpa)	Janka Hardness (Kn)	Density (Kg/m3)
Spotted Gum	23	150	75	11	900
Sydney Blue Gum	18	140	68	9	850
White Stringy Bark	17	133	68	8.8	880
Yellow Stringy Bark	17	132	72	8.5	870
Tasmanian Oak	15	110	60	5.7	620
Coachwood	14	100	48	4.6	620
Jarrah	13	112	61	8.5	820
European Ash	12	116	53	6.1	700
English Oak	10	107	na	5.3	700
Teak	10	106	60	4.9	640

NOTES

*Marketing name for a range of species, including mountain and alpine ash, etc.

Aside from coachwood, the other Australian species are all Eucalypt species.

This is but a small selection of the species available, but is representative.

Durability.

Australian timbers are classed into 4 durability grades, Class 1 being heavier timbers suitable for use, untreated, in the ground or under water, class 2 and 3 timbers being suitable for outdoor use, while class 4 timbers are classified "non-durable". Class 4 is a catch-all. Most of the above Australian timbers are in classes 2 or 3.

Tasmanian oak is classified class 3 or 4 depending on the least durable timber in the particular mix, while coachwood is classified class 4. My experience of European ash is that it is far less durable than either of these timbers, and would only enter class 4 due to the “catch-all” nature of this category.

Related Issues.

Most Australian hardwoods are hard and more difficult to work and shape than European ash. However, coachwood is a lovely timber to work with. Although they glue well with appropriate modern adhesives, some older types of adhesives may be less successful. Joints should be pre-drilled and screwed, using stainless steel or phosphor bronze screws – it is too easy to turn the heads off brass screws, and plain or even zinc or cadmium plated screws should not be used because the natural oils in some of the timbers may break down the coatings.

Preferably, treat the completed frame with an anti-fungal preparation, eg a copper naphthalene based product or one of the two pack products used in the yachting industry. Also I recommend painting the frame after the preservative soaks in and dries.

Suitable timbers are available, seasoned, from specialist timber suppliers. Some are used widely in the specialist furniture trade.

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