Cored Deck Failures

Cored decks (and hulls) This type of deck (and in some late vessels, the hull also) has the benefit of being very rigid for a given weight, but after many years the inner core which may be balsa wood, polyurethane foam or simple panels of encapsulated plywood may lose adhesion with the inner or outer skin, which affects the rigidity considerably. This is noticed by unusual flexing and creaking whilst walking on deck and perhaps odd water drips on the underside caused by the core absorbing water from the deck via deck fittings etc. This is not always easily detected at the early stages. This is why in survey the deck will usually be hammer tested, but again this can sometimes not detect this at an early stage. If ever detected, it may be possible to inject epoxy resin into a series of 3mm holes in the area of suspicion, and if the failure is limited to just bonding failure, this will reinstate the bond.

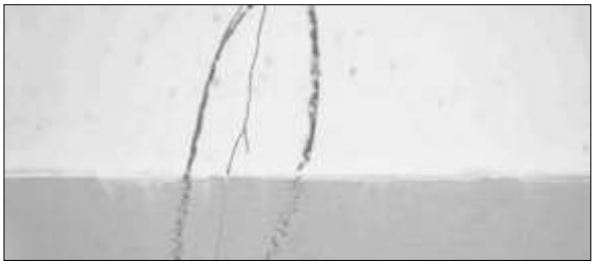
If a high presence of water has entered the core from leaks on deck, this can cause breakdown and failure of the core. Always ensure that deck fittings are maintained and any areas of strain or damage are attended to that may allow water into the core. In the case of serious breakdown of the inner core, whether it be balsa wood, polyurethane foam or plywood there is no option other than complete removal of this core. It is generally not feasible to remove the inner laminate to gain access to the core so most cases the outer laminate is removed. In the case of a failed deck core for instance, a considerable section of outer skin of deck will be removed by using a cutting blade on an angle grinder or something similar and cutting around the physical limits of the moulding. This section is then completely removed and full access to the underlying core can be made. Once reparations to the core are complete depending upon the type of core present, the outer section of deck will be

refitted and overlaid with epoxy resin and glass cloth along the boundary-connecting join.

As you can see, this would be a very expensive operation if repairs were required to this extent. It is not generally possible to remove any type of severely deteriorated core by simple access holes in the moulding, either above or below. One would have to take professional advice in deciding whether an area is suitable for localised repair or wholesale removal as, there would be a considerable difference in labour and overall costs. It is obvious from reading this that a cored hull that was showing severe breakdown would be phenomenally expensive to professionally repair and, it is likely that some boat yards would not undertake this scale of repair. Occasionally it is possible to drill drainage holes in one side of the laminate to allow saturated core to drain, but these holes have to be quite large because the only way of drying the core will be to use a heat gun on low setting to encourage gradual drying via these holes by heating the external laminate at various points.

A moisture meter will monitor the progress of this slow method. However, the original source of the water ingress must be located and cured. This could be as simple as a leaking fitting or as difficult to locate as a hairline crack some distance from the point of saturation. It is also required to ensure the bonding is reinstated. But beware of decayed balsa, plywood or polyurethane foam that has chemically broken down. These should be replaced as they are useless for strength now.

Longitudinal cracking



Vertical cracks can be serious

Longitudinal gel coat stress cracks in areas not associated with sharp corners would be considered more important structurally, particularly if there is a series of these. These will often take the form of either lengthwise running cracks in a hull or vertical cracks in a hull. Those that are noted as running lengthwise are usually due to some heavy stressing of the hull but not necessarily at that point of the hull and occasionally these can be found to enter the laminates.

The usual cause is the hull flexing over internal assemblies such as a berth support or something similar. These areas do usually require further investigation and gel coat removal due to the fact that they are often in areas either underwater or close to waterline. Long vertical cracks usually indicate the boat has flexed over the position of a bulkhead or hull stiffener.

This can be due to things such as being squeezed during excessive weather on moorings with several vessels either side.
In these particular cases it is always wise to ensure that vessel has fenders located at the strongest points, this would be directly over the positions of bulkheads not to one side which would allow the boat to flex over these bulkheads.

Again, these should be considered structurally important and worthy of further attention and/or repair. Unfortunately when undertaking surveys on vessels it can be extremely difficult and in some cases impossible to identify areas of longitudinal cracking if they are limited under the waterline, particularly if the vessel in question in has been recently painted.

The most difficult assessment for the surveyor to make is the importance of an identified hairline crack in the gel coat. In some cases it may simply be that, a hairline crack in the outer gel coat only however, there are many other cases where the cracked gel coat is in indicator that the laminate directly beneath it has also cracked and fractured, occasionally this fracture will be full thickness, often it is not. That is why any hairline crack that the noted in any underwater section will be rated as very important as there is a possibility it could be full thickness. It would be very unwise to ignore this situation if found.

Hairline cracks above the waterline, depending where they are can also indicate major or minor faults however, there is less likelihood of the

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vessel taking water through these, the exception being, in some cases where cracks around stanchion bases are noted, it has been no that although the crack looks innocuous, it has allowed continual seepage right through the laminate because the hairline crack is full thickness in the very rare cases.

Hard spot damage.

This is where an underlying bulkhead or stiffener within the hull that is contacting the skin of the hull causes a “hard spot”. When hammer testing the area, it is obvious that a “hard” item is directly behind the tested area. When the hull flexes, as nearly all do to a degree, the hull can hinge over this hard item and cause a crack in the gel coat and occasionally the laminate. The usual cause of this is fender loads when the fender is located a short distance either side of the stiffener or bulkhead. If the loadings are severe such as can be caused by gales alongside in harbour with other vessels either side, the squeezing

effect is considerable, flexing the hull and causing damage. Always ensure that fenders are located on bulkhead positions to minimise hull flexing. This defect will also occur in some vessels due to the vessel twisting when in a seaway and heavily stressed. Some vessels will experience severe enough twisting to deform cabin door entrances and other closely fitting components, which, when the vessel is at rest, will be perfectly normal. This twisting loads specific areas such as hull bulkheads where the hull skin is under considerable distorting loads and will cause hard spot cracking eventually.

Stressed Areas

Other gel coat cracks can be indicative of weak structure and this will often be found in places of high localised loadings such as stanchion bases, rigging U bolt support areas, and other highly stressed areas.

These are also very common areas on many vessels. Again, these should always be given priority as to assessment but, in some cases may only be due to the gel coat being unable to accept any flexing, in other areas they will be due to insufficient support on the underside of the laminate. Individual assessment is required.

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One significant area where this type of damage is seen is forward and aft of the keel on fin and twin keel vessels Due to the obvious high loadings on the hull at that these points. Usually grounding causes the aft end of any keel upwards into the hull, and straining the forward end away from the keel.

This type of cracking cannot be immediately identified as due to hull flexing. It identical to contact-damage or hard-spot cracking as described above. When repairing this fault it is important to determine how damage occurred. Installation of additional internal stringers or extra bracing may be required
One off damage can be reinstated as per original strength, but an inherent hull weakness would have to have further strengthening.