



# AmSafe Under Floor Cargo Nets

Unsafe Flying Conditions

# Introduction

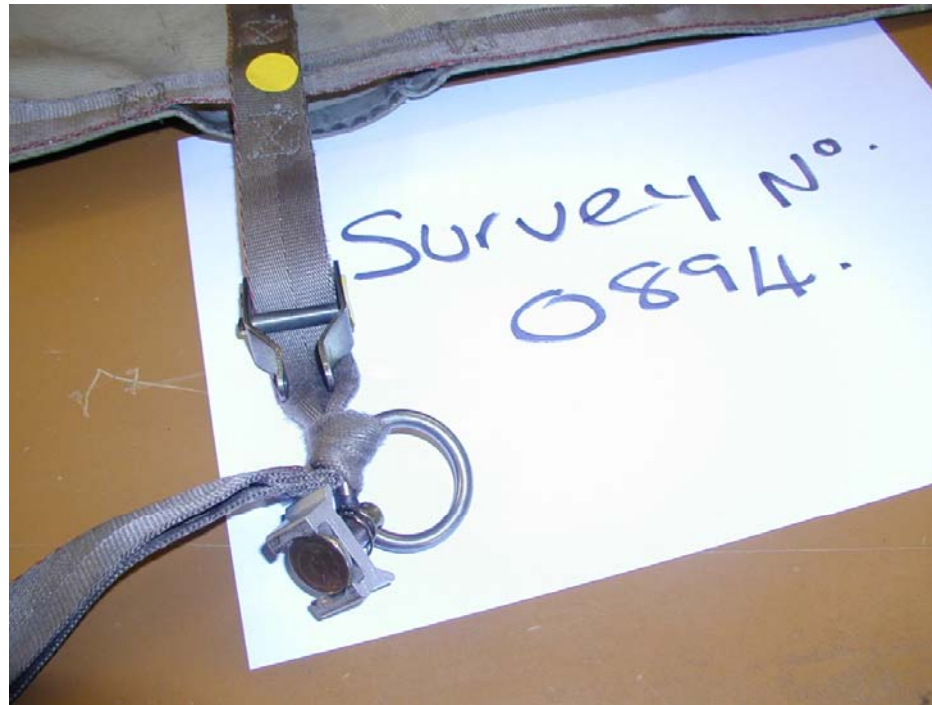
- AmSafe is the original equipment manufacturer of cargo hold restraints for all Airbus, many Boeing and the majority of other OEM aircraft.
- AmSafe also has a significant Part 145 repair/overhaul operation which maintains these parts.
- We have seen an increasing number of poorly repaired products coming into our repair centers.
- Cargo hold restraints are safety critical items that help maintain weight & balance and also meet fire regulations.
- The following pictures show some of unsafe conditions found during maintenance checks.
- In many cases the operator was unaware of the condition of their nets or of their culture with regard to their maintenance.

# Makeshift Fitting



The breakaway fitting on the left was repaired using a standard single stud and a split pin. The original fitting (right) is designed to break at a specified load to prevent damage to the airframe. This controlled failure may not occur if the repaired fitting is stronger than the original.

## Single Stud Tied On



This picture shows a single stud which has been tied on in place of an adjustment buckle. Tying a knot in webbing reduces its strength by typically 50%. In addition the net cannot be adjusted to its optimum tension; therefore, the load distribution on the net has changed which could result in catastrophic failure of the equipment.

# Illegal Parts



The grey fabric in this photograph is the correct specification and meets all design parameters including strength, flammability, smoke and toxicity. The blue fabric is part of an illegal repair, i.e. not in accordance with the equipment CMM as the repair uses the wrong material and the wrong repair method.

# Illegal Webbing Repair



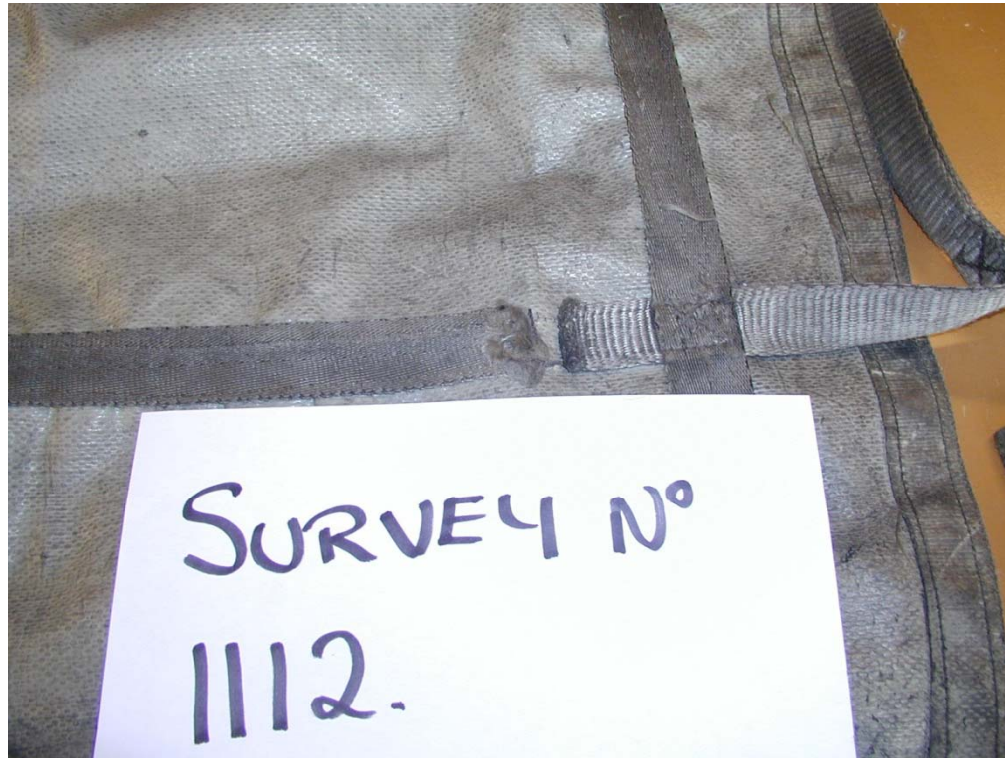
This photo shows how a steel ring has been used to join a broken vertical webbing element to the top horizontal web. It has been joined by tying the vertical element to the adjustable hand pull. Again, this will affect the load distribution and could result in catastrophic failure.

# Hand Stitch Repair



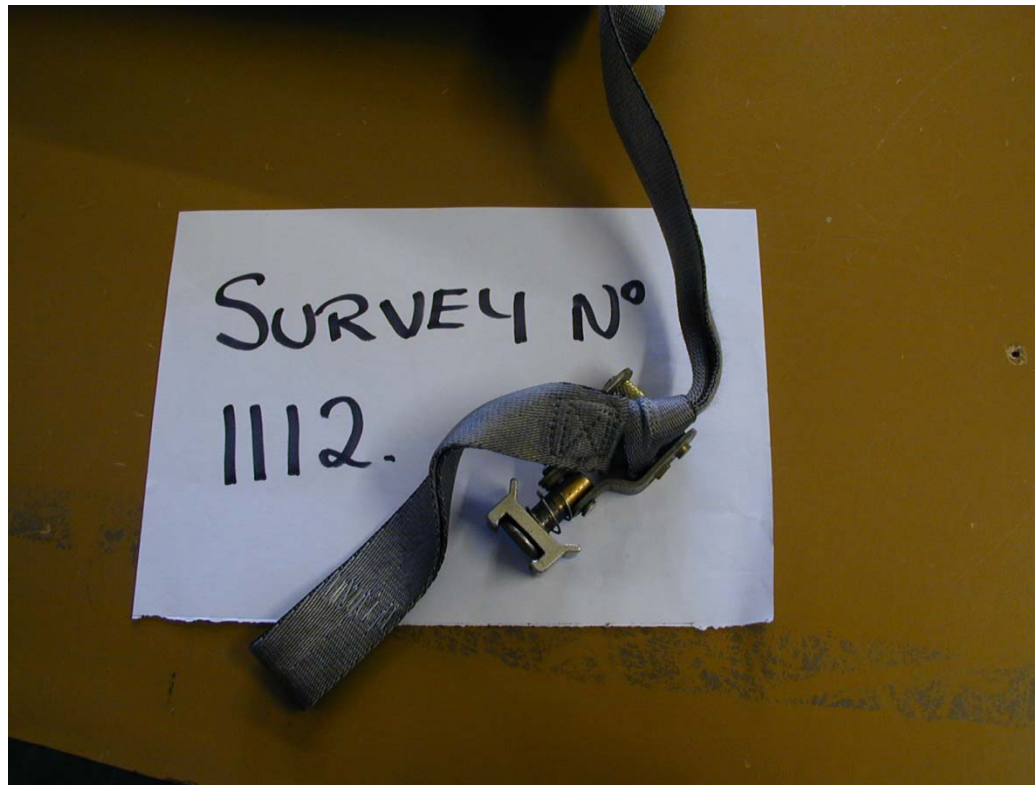
In this photo the webbing is broken at the stitched intersection and has been repaired with a hand stitch. The structural integrity of this net may be severely compromised.

# Illegal Webbing Repair



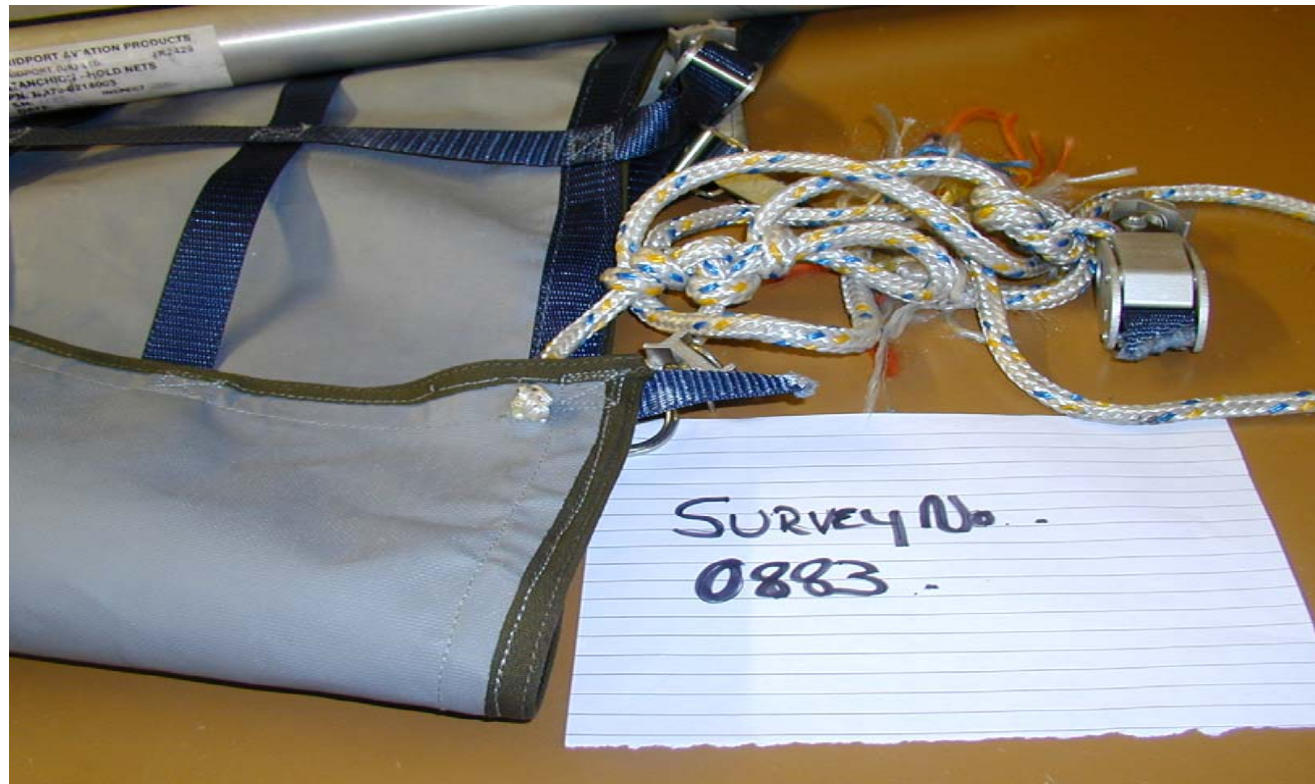
Here, broken webbing has been repaired by simply sewing it to the fabric cover; this renders the net unfit for purpose.

# Broken Fitting Tied On



In this photo, a broken breakaway fitting has been tied on losing the ability to adjust the net. This may change the dynamics of the net when loaded potentially causing airframe damage

# Ropey Repair



In this picture you can see how a length of rope has been used to tie on a cam buckle.

# Wrong Fabric



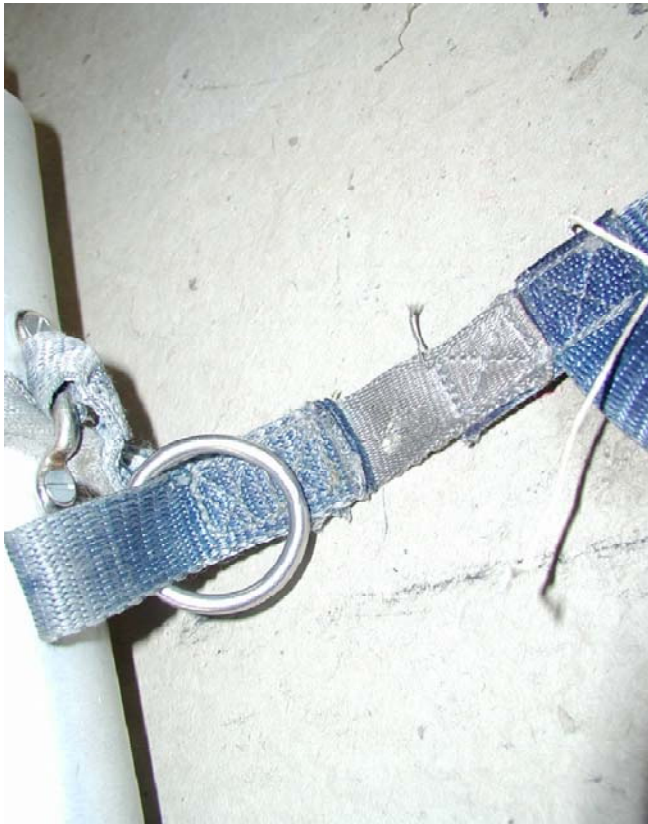
More examples of the wrong fabric being used to carry out repairs. In both cases the method of repair does not meet the requirements of the CMM.

# Illegal Repair



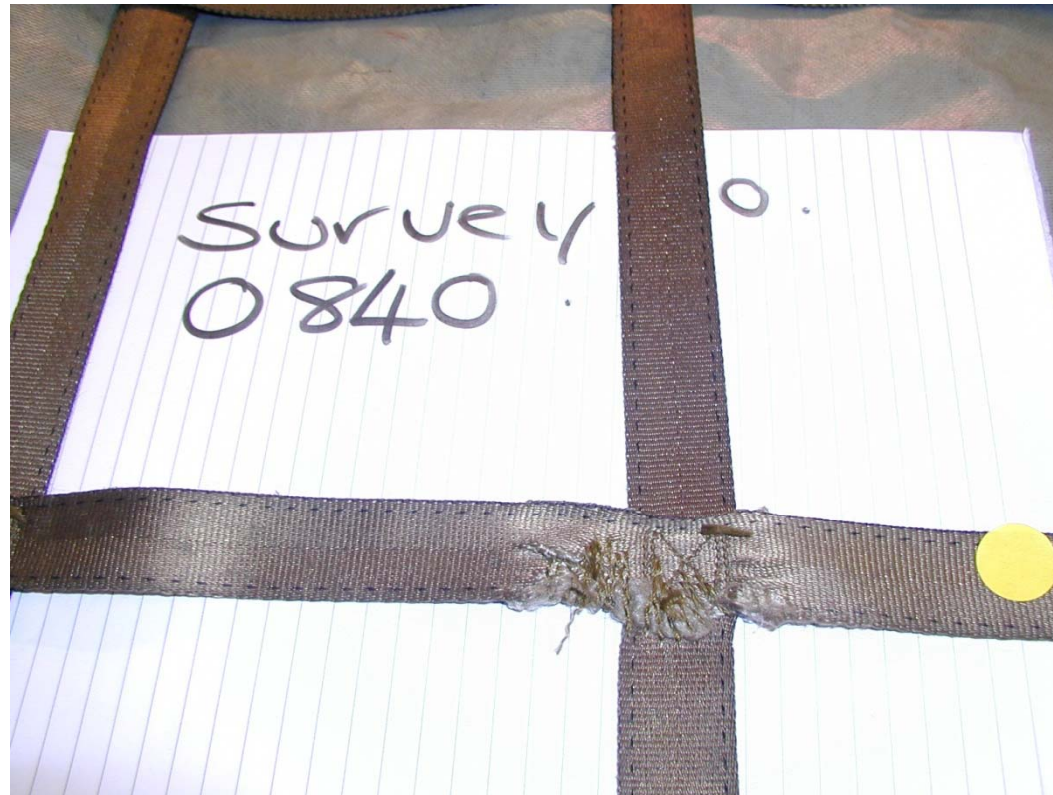
Here, the stitching has failed on a repair carried out using the wrong method and the wrong material. The strength of both the horizontal and vertical elements have been adversely affected.

## Incorrect Materials/Methods



The grey webbing in this photograph is made of a lower strength than the original supplied with the net. The method of attachment is incorrect and the strength of the net has been reduced in several places.

# Darned Nets



The webbing is cut and badly frayed and in this example, it has been repaired by darning the frayed edges by hand. This intersection is severely weakened and will not function correctly under load.

# Poor Sewing



The stitch pattern highlighted runs off the edge of the webbing thus severely weakening the vertical strap.

## More Illegal Repairs



The green fabric has been sewn onto one side of the net to cover up rips in the original fabric. The weight of the net has been increased significantly increasing fuel consumption. Importantly, the fabric used for the repair is not identified and not specified in the CMM.

# Summary

- Under floor cargo nets are safety critical equipment.
- They are designed to do their job without causing damage to the airframe.
- All examples of repairs shown herein are not airworthy and have not been performed in accordance with the equipment's CMM.
- All webbing and metalwork repairs shown affect the load distribution of the net and could result in catastrophic failure of the equipment.
- Nets should only be repaired after a structural survey to confirm that the integrity of the net is intact.
- An illegal repair often results in the net being scrapped as to correct it is not cost effective.
- Repair stations are bound by regulation to report and unsafe conditions to EASA and where relevant the FAA.
- When maintained correctly your nets will give you many years of service.
- EASA are currently reviewing the condition of textile restraints and imposing fines at UK airports.
- If an illegal repair was found by an EASA ramp inspector you would only be permitted to fly if a replacement was found or the cargo compartments adjacent to the equipment were empty.