# HMS Colossus

# Progress Report
## 2003

Kevin Camidge

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# HMS COLOSSUS

This report is submitted in compliance with the stipulation in the licence granted under the protection of wreck act that a progress report is submitted by October 2003. Most of this document has already been submitted to English Heritage in the form of routine progress reports. A copy of this report will also be deposited with the National Monuments Record of England.

## Summary

Four separate operations were undertaken on Colossus this year. These were the stabilisation trial, replacement of primary control points, survey work at the stern of the wreck and a series of escorted site visits.

*Stabilisation trial*
This work was commissioned by English Heritage. The intention of the stabilisation trial is to ascertain whether it is possible to protect the timber which is currently exposed and to prevent the buried timber from becoming exposed. The aim of the trial is to establish the efficacy and economic viability of three different protection strategies in the conditions prevailing on this site. By recording the prevailing conditions on the site it is hoped that a link can be made between the protection methods and the environmental conditions prevailing.[1]

The geotextile mats, timber samples and sub-sea datalogger were deployed in May 2003. Sand level monitoring points were also established around the wreck to monitor sediment levels. In August and October timber sample blocks were retrieved and analysed by Mark Jones of Mary Rose Archaeological Services. Data was successfully recovered from the datalogger, which has now been removed from the seabed for the winter. The datalogger will be redeployed in April-May 2004. The trial is scheduled to end in May 2005, the final report will be submitted by July 2005.

*Replacement of primary control points*
The primary control points were installed in 2001 and 2002. They consist of 10mm diameter steel reinforcing rod driven into the seabed. Some galvanised steel nails were also used, fixed into the timber of the wreck. While trilaterating the trial areas and the sand monitoring pins it became apparent that considerable corrosion of these control points has taken place. The diameter of the reinforcing rods had been considerably reduced, particularly at the junction with the seabed where some had been reduced to 2 or 3 mm in diameter. Similarly, the galvanised nails had almost rusted through. The effect was similar to that previously noticed on the upstanding copper fastening pins of the wreck.

All the primary control points were replaced with marine grade stainless steel pins 10mm diameter by 0.5m long. In addition four master control points were placed around the wreck – these consisted of stainless pins set into granite blocks which were partly buried in the seabed. This work was undertaken in August 2003.

[1] For full details see *HMS Colossus Stabilisation Trial Project Design*

*Survey*

This work was also commissioned by English Heritage. The stern of the vessel continues to be exposed by erosion of sediment from the site. Timber at the stern of the vessel is now standing 0.25m proud of the seabed. These timbers were thought unlikely to survive the coming winter storms so a detailed survey of this area was undertaken. The area surveyed comprises 108 square meters, bounded by control points P1, P2, PP1 and PP2. The survey was accomplished in six days of diving.

*Escorted Visits*

About 40 divers were escorted around the site on 11th and 12th of August 2003. About half of these were visiting divers, the other half were local Scilly divers. The divers were escorted by members of the regular dive team in groups of four and five.

# Stabilisation Trial – Progress Report May 2003

This work was undertaken between 10th and 21st May 2003. I am happy to report that the installation of the stabilisation trial was successfully completed as laid out in the project design. The only things which were not as planned were the weather and the underwater visibility – both of which could have been better.

The three test areas and the control area were marked out using steel pins, which were then positioned by trilateration from the existing control points. The positions were validated using the Site Surveyor II software (fit to within 23mm). This was then plotted on the georeferenced AutoCAD 2000 master drawing. The test areas were labelled as shown in the table below.

| TEST AREA | TRIAL TYPE |
|---|---|
| | |
| V0 | Control |
| V1 | Terram 4000 |
| V2 | Mesh (debris netting) |
| V3 | Floating frond mat |

The oak and pine sample blocks were fastened on the surface of the seabed using cable ties and iron staples – see photo. The geotextile mats were laid as specified in the project design with the following exceptions:

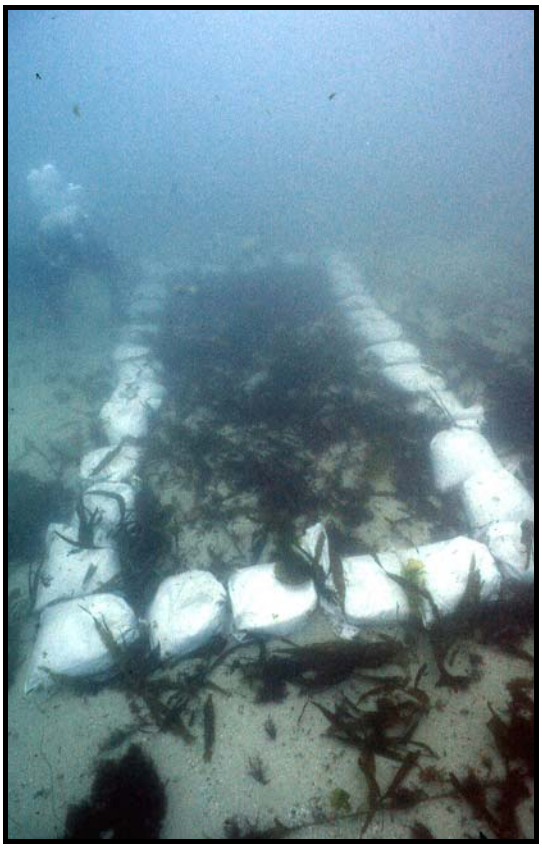
*Debris Mesh.*
It was found that the mesh quickly trapped large amounts of weed, increasing the tidal drag on the mesh. As a result the ends of the mat were being dragged along the seabed. To obviate this the ends were tie-wrapped to stainless steel staples driven into the seabed – this was in addition to the sandbags. This appeared to solve the problem.

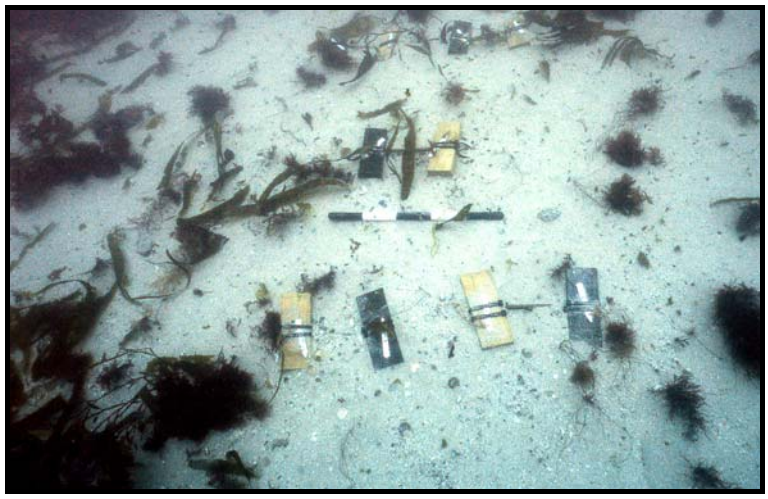
*Floating frond matting.*
After discussion with the manufacturers, Seabed Scour Systems, it was decided to anchor this mat down with a double layer of sandbags. This was to ensure that the mat is not displaced by the tide prior to the anticipated sand build up.

*Data logger*
Once the mats and timber sample blocks were in position the sub-sea data logger was deployed. The machine was set to take readings every hour – at this setting it will function for over six months. The logger will be downloaded and recharged after three months (August 18-20th).

*Sand monitoring points*
The sand monitoring points M1 – M8 were placed around the wreck. These were fixed with 100mm standing above the level of the surrounding seabed – as measured using a 100mm x 1m steel pole. Once placed the pins were positioned by trilateration from the existing control points. After validation by Site Surveyor the pins were added to the georeferenced AutoCAD 2000 site master plan.

Finally the test mats, data logger and the most eroded parts of the wreck were photographed. Unfortunately the underwater visibility was not as good as it could have been.





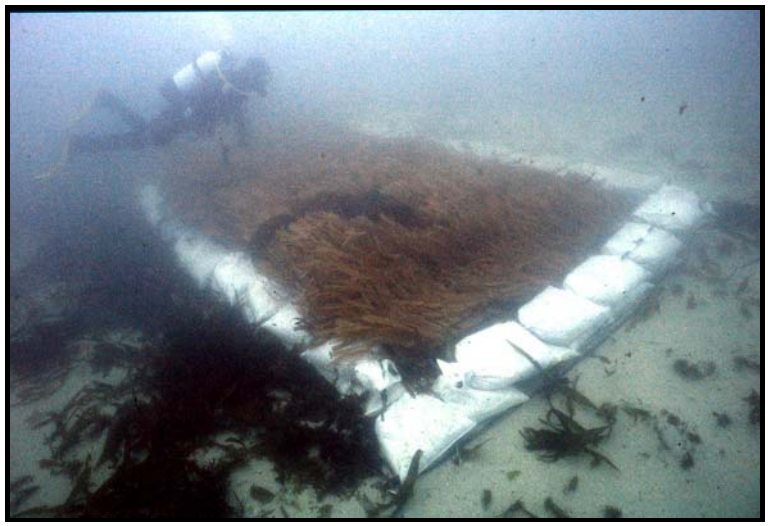
Above : The timber sample blocks on the seabed in the control area V0. Note the steel staples and cable ties used to hold the blocks in position. Scale = 0.5m

Left : The Terram 4000 mat in position in area V1, held in position by a single layer of sandbags

## The Trial Mats

Left : The debris netting deployed in V2. The mesh is the darker area behind the row of sandbags. Scale = 0.5m

Below : The floating frond mat from Seabed Scour Systems in area V3. Note the double layer of sandbags used to hold the mat in



## The data logger

The data logger on land connected to a laptop to allow calibration and set-up. Note the sensing probes to the right of the steel base plate.

The data logger installed on the seabed between test areas V2 and V3. Note the sandbags (to the right of the data logger) protecting the sensor cables.

The data logger during installation of the protective cover consisting of a sheet of butyl pond liner.

## Gun 8

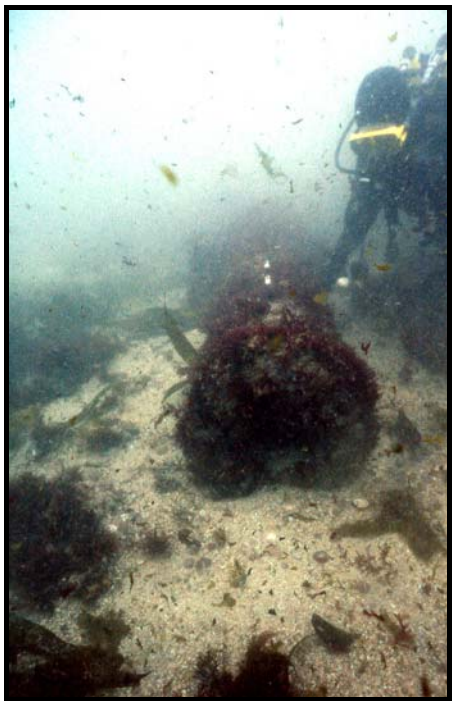
Reference to the site plan showed that Gun 8 (previously only seen by the ADU in 2002) was situated some 17m due south of V3C (the frond mat corner pin). A quick search of the area located this gun – when surveyed it was found that the ADU GPS position was only about 3.5m from the actual position. The gun was quickly measured; interestingly it is a Blomefield pattern 32lb gun, the type which superseded the Armstrong guns from the 1790s onwards. All the other guns which I have seen on this wreck (G1 to G7) appear to be of the earlier Armstrong pattern. This is the only 32lb gun which I have seen from Colossus – it will be interesting to note whether the others are all of the Blomefield pattern or whether Colossus carried mixed lower deck guns. Perhaps the ADU video footage of Gun 9 (also probably a 32) could be obtained and checked.

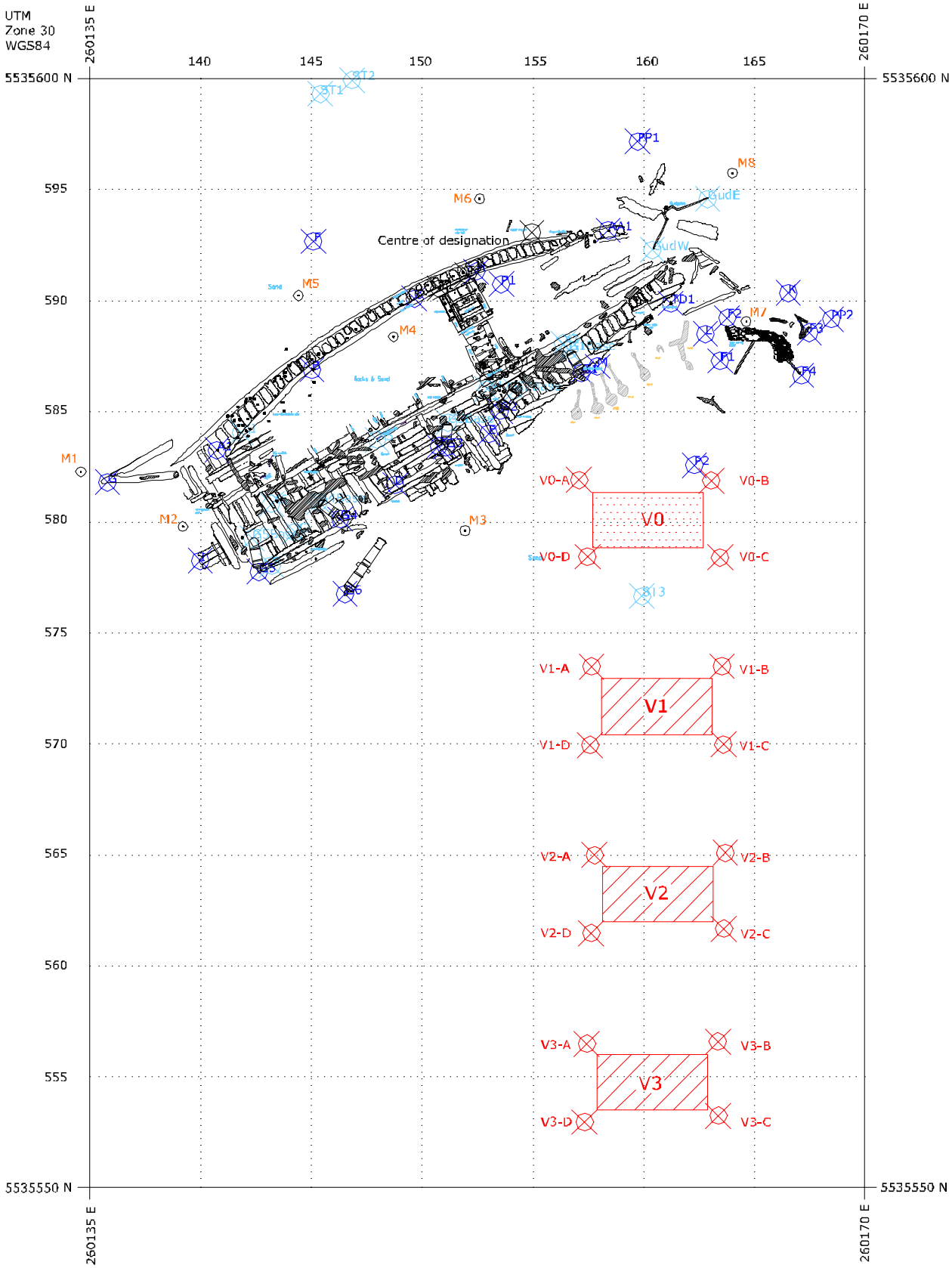
**Gun 8**

Left : From above, in very poor visibility. Note that the gun is upside down.
Scale = 0.5m

Below left : The cascabel of the gun

Below : The muzzle






Plan of stabilisation trial areas

# Stabilisation Trial – Progress Report August 2003

Work on the first sample and data retrieval began on 18th August 2003. Everything went smoothly and in accordance with the project design.

## Visual Inspection

The equipment and samples installed in May 2003 were all still in place and in good order. Inspection of the three mats showed that none of them had attracted any significant amount of sediment.

*V0 – Control*
All control blocks were still in place. There were noticeable amounts of marine growth attached to the blocks but no measurable change in the seabed level around the control blocks.

*V1 – Terram 4000*
This mat was still in place. The sandbags holding the mat in place were exhibiting moderate weed growth. The mat itself was thickly covered with a fine rust coloured seaweed; this was 0.10 to 0.15m in height. Samples were taken of this weed and I hope to have an identification made (any suggestions?). A very thin coating (1-2mm) of sand was evident over the surface of this mat.

*V2 – Debris Mat*
Although this mat was still in position it was no longer floating freely in the centre. The mat had been anchored to the seabed by a coating of rust coloured weed similar to that encountered on the Terram mat V1. In accordance with the instructions given to me by Martijn Manders (page 13 of the Project Design) another layer of mesh was installed over the top of the existing mesh. The ends were fastened to the sandbags and the middle allowed to float freely c.0.50m above the seabed. There was no measurable change in the level of sediment in the area of this mat.

*V3 – Floating frond mat*
This mat was also still in position. Interestingly, the floating fronds had become a preferred habitat for numerous small fish and shrimps. Some weed was also growing on the fronds. There was once again no measurable accumulation of sediment around the area of this mat.

*Conclusions*
I was somewhat surprised that none of the systems under test had accumulated any measurable amount of sediment. The mesh (V2) and floating frond (V3) mats both have proven track records when used elsewhere. There is evidently sediment movement on the site, as the stern area continues to uncover. The question is, therefore, why these mats are not collecting sediment. Two possible reasons for this occur to me at this stage. Firstly, during the first three months of the trial we have had a spell of very settled weather – the mats may well behave differently during more turbulent conditions. Secondly, it has been suggested that the sand movement on this site is due to a 'ground effect' rather than sediment in

suspension – presumably an effect similar to the movement of sand dunes in the desert. We shall probably have to wait until the site has been subjected to storm conditions for an answer.

## Sand level monitoring

A number of the sand monitor pins were disturbed, probably during the site visits undertaken on 11th and 12th of August; one pin, M5, had been pulled out entirely. The table below shows the level changes recorded by these monitor pins.

Sand monitor levels taken 18th August 2003

| Monitor | Position | Height above the seabed (mm) | Change since May 2003 (mm) |
|---|---|---|---|
| M1 | 260134.63 / 5535582.30 | 34 | +66 |
| M2 | 260139.21 / 5535577.81 | 25 | +75 |
| M3 | 260151.95 / 5535579.60 | 27 | +63 |
| M4 | 260148.74 / 5535588.34 | 122 | -22 |
| M5 | 260144.43 / 5535590.22 | Dislodged | - |
| M6 | 260152.61 / 5535594.58 | 30 | +70 |
| M7 | 260164.66 / 5535589.07 | 37 | +63 |
| M8 | 260164.05 / 5535595.79 | 51 | +49 |

In all but one case (M4) the sand would appear to have risen rather than fallen. Observation of the wreck would suggest that while this is the case at the extreme western end, the middle and eastern sections have been visibly further exposed since my last observations in May this year. The single instance of a recorded sand level fall (M4) is also the pin closest to the timber of the wreck – possibly suggesting that the fall in sand levels may be a localised phenomenon. Hopefully the extra monitor points (M10 to M15) installed at the edge of the timbers will elucidate this point.

Once the readings were taken the pins were all reset to 100mm above the surrounding seabed. Pin M3 was moved to a new position (260154.79 / 5535577.27) and relabelled M3b – this was so that the new granite block control point (MC2) could be correctly positioned.

The additional six new sand monitor points (M10 to M15) were put in place at the edge of the timber (see plan). These consisted of six galvanised 100mm nails driven into the edge of robust timbers. Measurements to the seabed were made at a distance of 0.50m using a spirit level. It is hoped that these new sand monitor points will be less susceptible to disturbance.

Additional sand monitor points installed August 2003

| Monitor | Position | Height above the seabed on 28/08/03 |
|---|---|---|
| M10 | 260158.94 / 5535594.51 | 10mm |
| M11 | 260145.54 / 5535588.37 | 51mm |
| M12 | 260136.34 / 5535581.65 | 11mm |
| M13 | 260145.30 / 5535578.35 | 24mm |
| M14 | 260153.30 / 5535582.53 | 42mm |
| M15 | 260164.26 / 5535590.60 | 95mm |

## Timber sample retrieval

The oak and pine sample blocks were retrieved from each of the test areas. These were then labelled, packed into a cool box with ice packs and dispatched to Mark Jones at MRAS by 24 hour courier. Mark Jones will undertake the analysis of the timber sample blocks and the associated data from the datalogger.

Timber samples recovered August 2003

| Sample | Type | Location | Deployed | Retrieved |
|---|---|---|---|---|
| P1 | Pine | V0-A (Control) | 13.V.2003 | 19.VIII.2003 |
| O1 | Oak | V0-A (Control) | 13.V.2003 | 19.VIII.2003 |
| P6 | Pine | V1-A (Terram) | 14.V.2003 | 19.VIII.2003 |
| O6 | Oak | V1-A (Terram) | 14.V.2003 | 19.VIII.2003 |
| P10 | Pine | V2-A (Mesh) | 14.V.2003 | 19.VIII.2003 |
| O10 | Oak | V2-A (Mesh) | 14.V.2003 | 19.VIII.2003 |
| P14 | Pine | V3-A (Fronds) | 16.V.2003 | 19.VIII.2003 |
| O14 | Oak | V3-A (Fronds) | 16.V.2003 | 19.VIII.2003 |

A new set of sample blocks was installed under Mat V2 (debris netting) adjacent to the sub-sea datalogger probes. These will be retrieved in October 2003 and will complement the data set retrieved then.

## Sub-sea datalogger

The data logger and probes were successfully retrieved from the area of the floating frond mat V3 where they were installed in May this year. The data was downloaded and is included with this progress report as an Excel file. The datalogger was then recharged and the probes recalibrated.

Some initial difficulty in recalibrating the redox probe was resolved by removing biological material from around the sensor. This is also the probable cause of some unlikely looking blips on the redox graph – see attached Excel file. I am currently talking to the manufacturers and Mark Jones about this and hope to know more soon. But if the blips are ignored the redox data accords well with the levels of dissolved oxygen recorded.

Interestingly, the dissolved oxygen levels under the floating frond mat fell from initial values of around 100% to less than 1% in a period of only six days. This quickly stabilised at or near zero for the remainder of the trial. As the floating frond mat had not accumulated any measurable sand this effect was most probably due to the layer of geotextile on which the mat is based. The pH, Temperature and depth data appear to me to represent the expected values.

The datalogger was then redeployed with the sensors monitoring the new three month blocks installed under the debris mesh mat V2. The datalogger will be recovered for the winter in October this year – as specified in the project design.

# Control point replacement

The primary control points on site were put in place in 2001 and 2002. They consisted of 0.3 to 0.4m lengths of 10mm diameter steel reinforcing rod driven into the seabed. Earlier this year it was noticed that severe corrosion of these pins was occurring, especially in the vicinity of the upstanding iron guns (G1 to G5). Normally, this reinforcing rod survives without any noticeable corrosion for at least five years. Presumably the iron guns are acting as cathodes causing the more reactive mild steel rods to become anodes and thus subject to electrolytic corrosion.

It was decided to replace the primary control points with 316 grade stainless steel rods, 0.50m long and 10mm in diameter. In addition four master control points (MC1 to MC4) were installed around the edges of the wreck. These consisted of granite blocks (average size 0.60 x 0.60 x 0.50m) with stainless reference points set into them (granite drilled and stainless bar set into the hole using chemset[2] resin). The granite blocks were then sunk into the sand of the seabed. Their position was then determined relative to the existing primary control points (at least six ranges and a depth for each block).

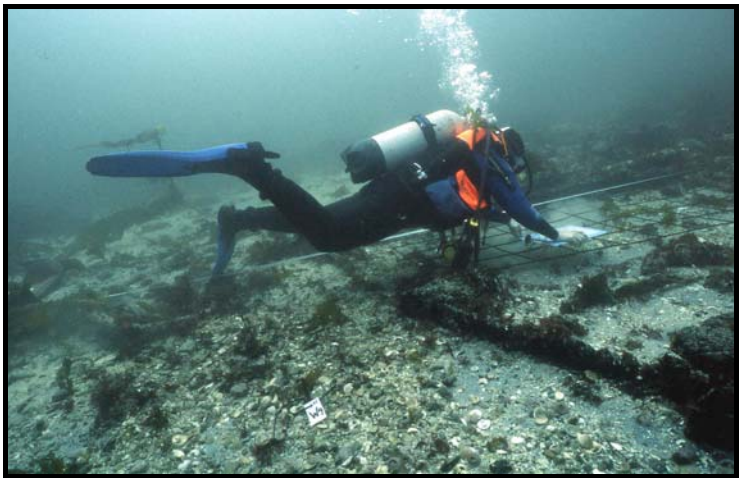
The following control points were retagged but not replaced in stainless. These are mainly existing points of the wreck such as copper alloy pins and gun cascabels.
A1, AA1, B, G1, G5, P1, P2 and PP1.

The following primary control points were replaced with stainless rod and retagged.
C, D, E, F, G, H, I, J, K, L2, PP2 and M.

The following secondary control points were replaced with stainless rod and retagged.
ST1, ST2, ST3, V0-A, V0-B, V0-C, V0-D, V1-A, V1-B, V3-C and V3-D.

The following master control points (granite blocks with stainless pins) were created and surveyed in.
MC1, MC2, MC3 and MC4.

[2] Chemset – A polyvinyl resin used for securing rock bolts in hard rock mining.

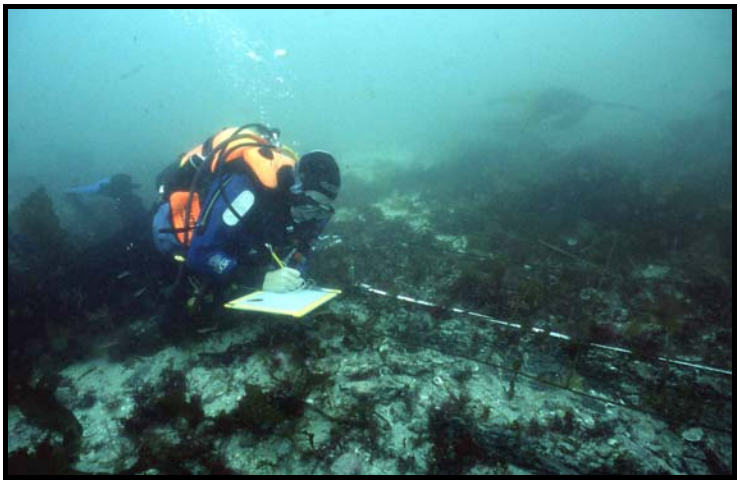


Above : Survey in progress

Left : Exposed timber, looking from gunport 0 towards gun 1.

## Photographs – August 2003

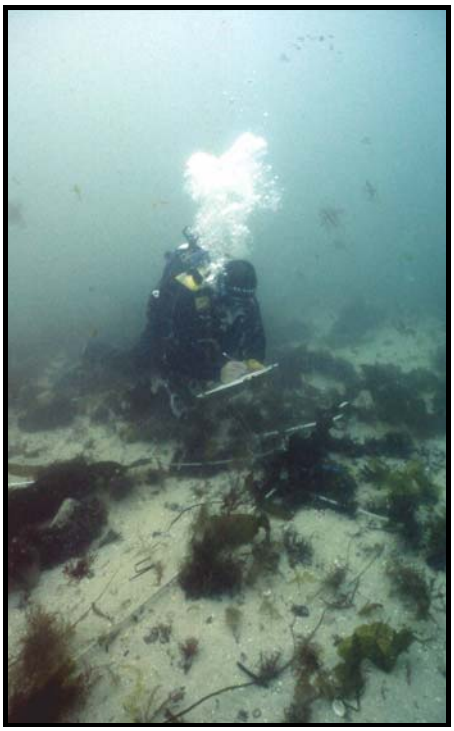
Left : Gudgeon strap and inner stern post (?)



Above : G8 showing the cascabel ring

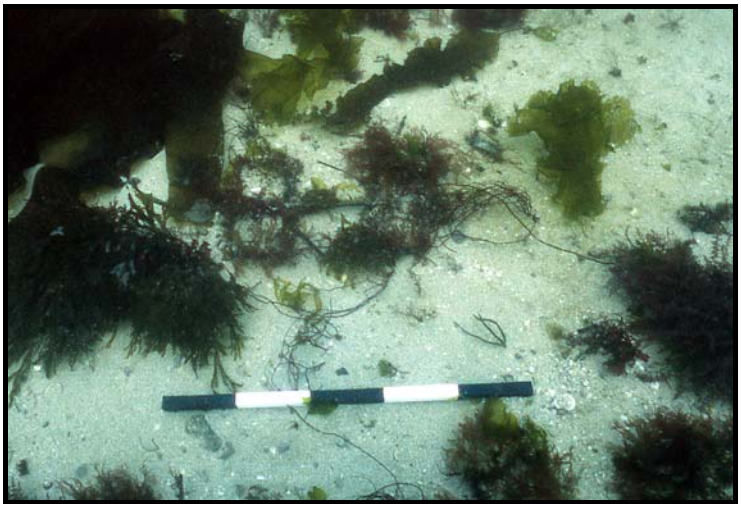
Left : Lining timbers of the port side quarter gallery (immediately in front of the Lead pipe TD1)

**August 2003**

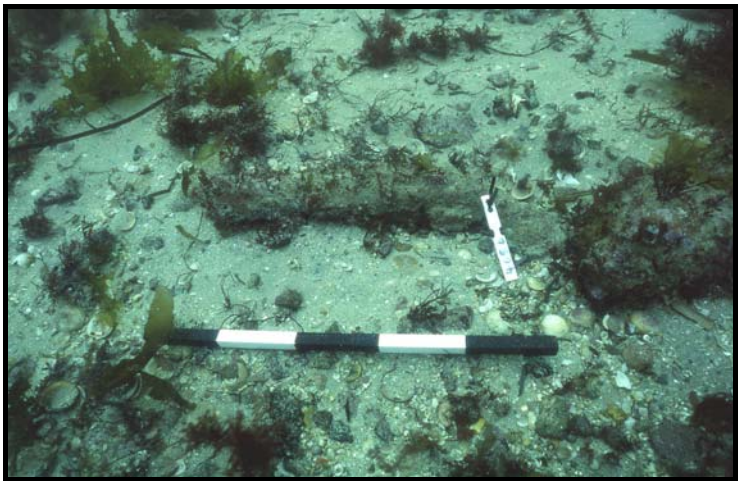


Left : Survey in progress

Below : Timber sample blocks secured to the seabed in the control area V0.



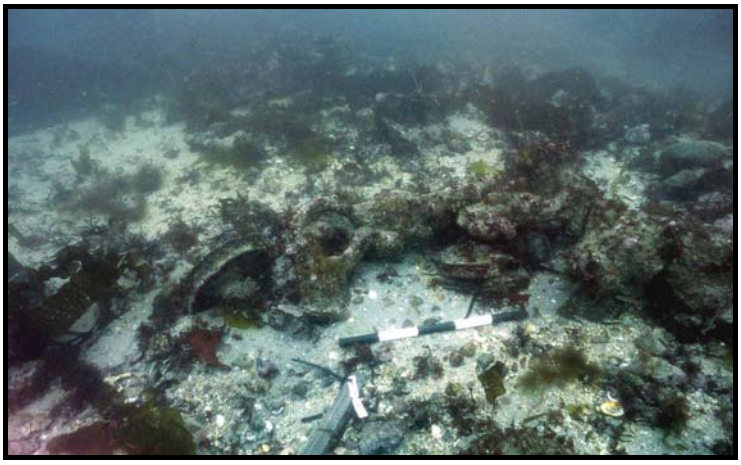
Objects on the seabed

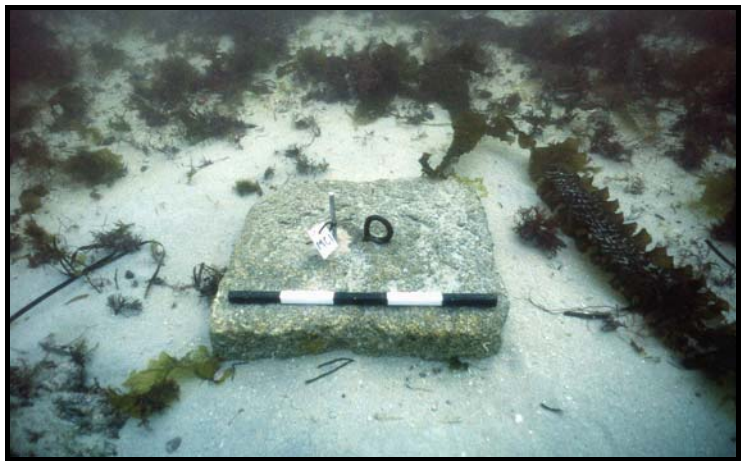


Above : Musket 262

Left : Pistol 405

Below : Fe concretion – remains of chain plates.





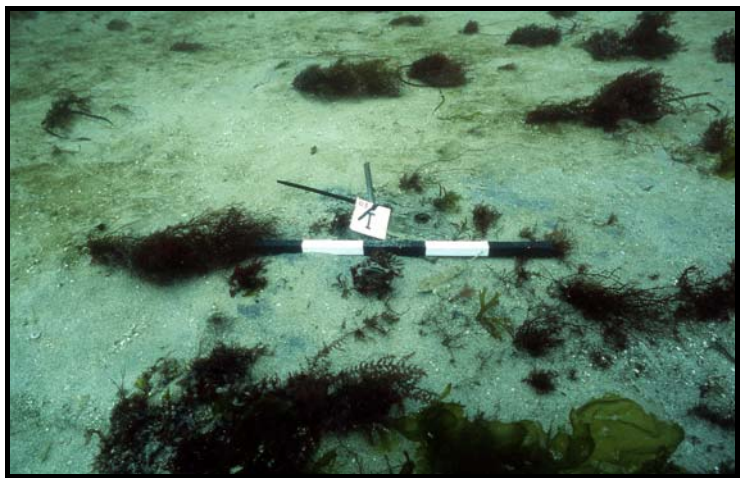
Above : Master control point MC1 in place on the seabed

Left : Terram 4000 mat (V1) showing the weed growth on the mat

**August 2003**

Left : Frond mat (V3)

Below : Stainless steel control point I



# Survey August 2003

This survey was of the area originally recorded by photomosaic in August 2001 – that is the area bounded by control points P1, P2, PP1 and PP2. This had been the first survey undertaken on the site; it constituted the pre-disturbance survey carried out in advance of the ADU's excavation of the stern carving in September 2001. It is worth briefly looking at that survey to see why it was necessary to resurvey this area.

## The Photomosaic

The photomosaic was commissioned by Mac Mace, the licensee of the site in 2001.The photomosaic was undertaken by commercial underwater photographers Primary Productions. It consisted of 432 photographs, each of a half metre square of the seabed – these were recorded on chromogenic monochrome film (XP2) taken with a Nikonos V/15mm mounted on a four legged frame. The negatives were then scanned and the digital images scaled to 1:10, stitched together and printed on A4 sheets. The plan was traced from these photographs and then reduced to a scale of 1:20. The whole process was very time consuming. It took Primary Productions nearly two weeks to take the photographs, the digitising, scanning and scaling took a further two weeks and the drawing of the plan took three days. Interestingly, it only took six days to draw the same area in considerably more detail using traditional survey methods (see below).

It is worth looking at why the drawing produced by photomosaic was unsatisfactory. Firstly, most of the visible remains were partly obscured by sand and weed – if even moderate 'hand-fanning' had been employed a great deal more would have been visible. Secondly, the half-metre squares were too small. This resulted in the camera being too close to the seabed, which caused problems with upstanding objects, particularly the iron work. It would have been better if one-metre squares had been used (and much quicker – 108 photos instead of 432). Finally, by 2003 0.25m to 0.30m of sand had eroded from this part of the site – resulting in much more of the wreck being visible. Parts of the wreck were so exposed by August that timber was standing 0.25m proud of the seabed. It seemed unlikely that this timber would survive the coming winter.

I know from undertaking a number of photomosaic surveys on land that this technique can work – but that rigorous controls and proper planning are essential if the method is to have any advantages over traditional survey.

## Date and team

The survey was undertaken between 21st and 28th of August 2003. The work took place after the scheduled work on the stabilisation trial. The regular team of four was ably assisted by volunteers Janet  and Robin Witheridge for the survey.

## Survey Methodology

The drawing was all done at a scale of 1:20. One metre square planning frames were used; these were positioned relative to secondary control points created especially for this purpose. The site sheets were then digitised and input to the georeferenced site plan in AutoCAD. It was found that on average a diver could draw about six square metres an hour. This of course varied depending on the complexity of the material being drawn – as little as three square metres and as much as ten square metres were achieved.

## Survey Methodology – the technical details

All drawing on site was done on A4 sheets of drafting film at a scale of 1:20. One metre square planning frames were used – these consisted of steel reinforcing mesh with a mesh size of 0.20m. Positioning of the planning frames was achieved using secondary control points (points W1 to W18) which were surveyed relative to the existing primary control points. The secondary control points were validated and located using the Site Surveyor software supplied by 3H Consulting. This allowed a DXF file of the secondary control point locations to be imported into AutoCAD 2004. The site sheets were scanned to bitmaps using an ordinary A4 flatbed scanner, and were then imported into AutoCAD and scaled and transformed to fit the georeferenced secondary control points. The drawing was then digitised by tracing over the bitmaps. Once the tracing was made the bitmaps were deleted from Autocad. The resulting AutoCAD drawing is georeferenced (UTM zone 30) and at a scale of 1:1.

## Conclusions

There are a number of interesting features shown on the survey – these are discussed below.

*Possible inner stern post*

The substantial piece of timber lying under the gudgeon strap is probably the remains of part of the stern post. It is 4.5m long, 0.59m wide and about 0.25m deep. At its southern end this timber has the remains of two other timbers joined to it at an angle – these are probably parts of the deadwood. There are two iron fastenings still attached to this timber, an iron staple [*Fe staple*][3] and an iron bolt. This timber should probably be the other way up (the adjoining timbers would have originally faced west) – it possibly turned when it became detached and fell to the sea bed. [*Inner Stern Post*]

[3] Text in square brackets corresponds to the labelling on the site plan

*Quarter galley lining timber*

In the vicinity of the rearmost upper gun deck port a number of thin softwood planks (c. 0.01m thick) have been exposed on the seabed [*Quarter gallery lining boards*]. These are lying partly under (outboard of) the outer hull planking. As this is very close to the area where the quarter gallery would have been attached to the hull, this timber was probably originally part of the lining (internal decoration?) of the port side quarter gallery. This timber is very fragile and has already started to break up. It may be worth considering taking a small sample of this timber before it is dispersed.[4]

*Chain plates*

A number of iron concretions to the south of the surviving timber at the stern are probably the remains of the port side mizzen chain plates. The chain plates were iron straps which attached the lower deadeyes of the shrouds to the outside of the ship's hull. These shrouds were substantial, and were likely to be rope of about 6" circumference[5]. Six iron concretions are visible on the plan [*Mizzen chains*]; two of them clearly show the holes where the deadeyes would have been. These are both about 0.26m in diameter (just over ten inches) – the Bellona deadeyes were apparently 9¾ inches in diameter. The mizzen chain plates are shown on one of the existing building plans for Colossus – the surviving iron concretions are in exactly the place shown for them on the building plan[6].

*Knees*

At least two knees are visible on the survey. These are situated on the orlop deck, on the northern edge of the wreckage. Interestingly, one of these knees has lap-boarding attached to both faces – exactly as found on the orlop deck in the exploratory excavation conducted in 2002. Once again this lap-board is laid 'upside down' to the conventional method. For a full discussion of this phenomenon see p35-36 of the 2002 survey report. This is probably indicative of another small compartment or cabin on the orlop deck.

*'Stern bench'?*

At the stern of the wreck on the upper gun deck there is a small box or bench-like structure [*Stern bench?*]. This appears to consist of a number of planks, currently protruding from the seabed, end-grain first. It seems to form a small box or bench constructed on the deck against the stern of the vessel. This is some 0.42m high and 0.58m deep. As well as looking like a bench the height would make this eminently suitable as one.

*Lead pipe*

A number of pieces of lead pipe appear on the survey, varying in diameter from 0.05m to 0.10m. For the most part, these are lying on the seabed and are probably displaced from their original location. One piece is, however, still definitely in situ; it has been incorporated into the space between the inner

[4] In October 2003 a small (0.10 x 0.02 x 0.02m) sample of this timber was taken from position 260160.40/5535589.58 (UTM zone 30). It is intended that this will be used for timber identification.
[5] B Lavery – *The 74 gun ship Bellona* London 1985
[6] NMM 652 – Draught of Colossus

and outer planking of the stern [*Pb pipe in timber channel*]. These lead pipes would have been used as scuppers and also for the captain's toilet facilities which were apparently situated in the port side quarter gallery[7].

*Outlying timbers*

There are two substantial timbers exposed to the east of the stern (see '*Site Plan with Labels*'). These do not appear to be attached to any other timbers. They may have been a part of the stern post structure. There are also detached timbers to the NW of the main area of wreckage; these have not yet been drawn.

*Small finds*

A number of small finds were recorded on the survey – these were recorded and numbered but were left on the seabed. They included three muskets [*Muskets*], a small pistol [*Pistol*], an octagonal sounding lead [*Sounding lead*], a rectangular lead weight, possibly a sash weight [*Sash weight*], a number of copper alloy fastening bolts, a copper alloy washer for a fastening bolt [*Cu alloy washer*], a musket trigger guard [*Trigger guard*], two block sheaves [*Sheave*] and a double sheaved block [*Block*]. Where small find numbers have been allocated these are shown on the plan. A number of these artefacts are very vulnerable – the muskets in particular are now standing well proud of the seabed and cannot be expected to survive for too much longer. It would be interesting to know whether any of these items are of any value for research, in which case they could be recovered for the interested institutions; otherwise they will inevitably be lost. One alternative would be to rebury the items on site, perhaps in one of the existing reburial repositories.

*Interruption to inner planking*

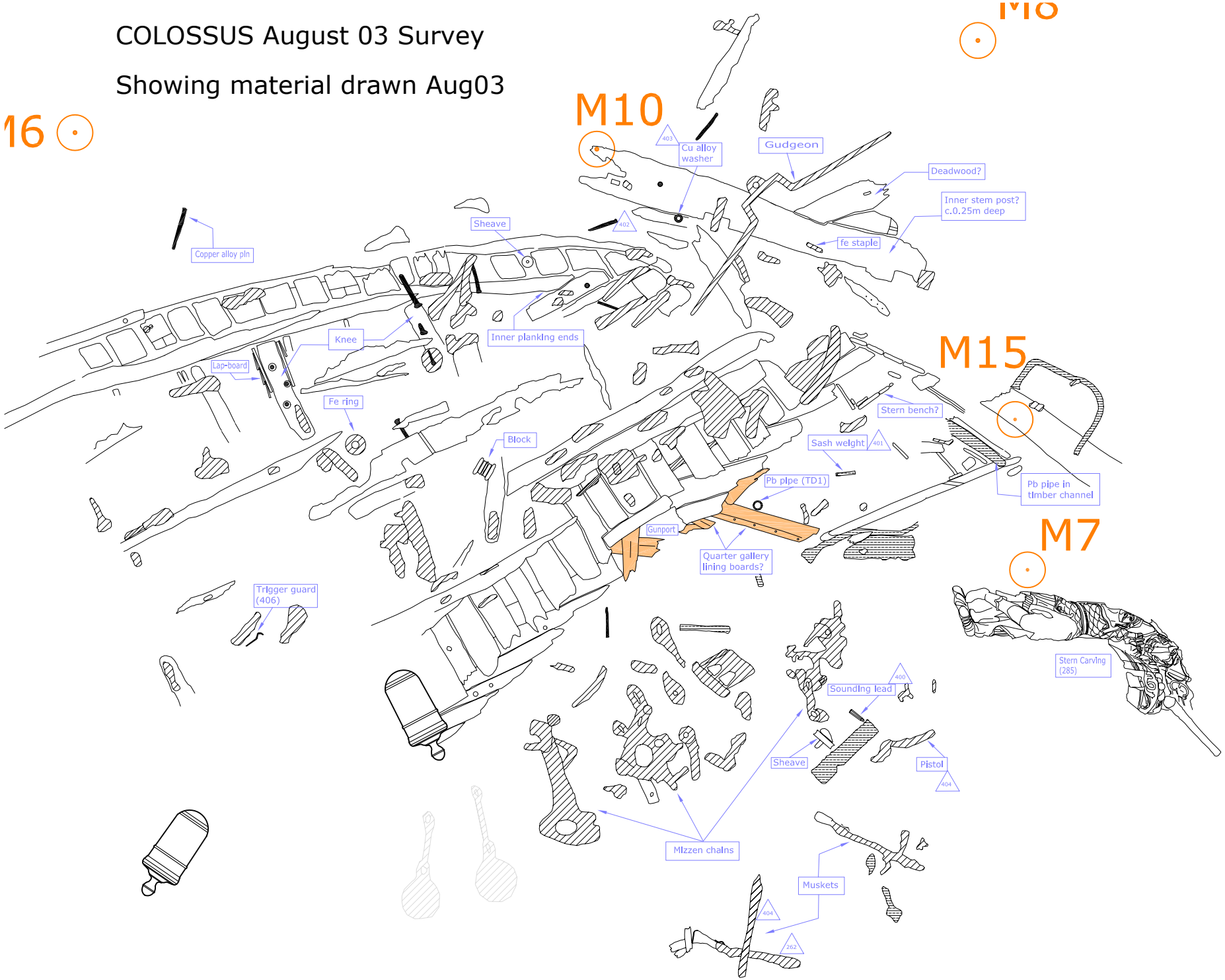
On the north side at the stern (on the orlop deck) there is an interruption to the inner hull planking [*Inner planking ends*]. At this point another piece of timber is joined at an angle. This is probably a constructional feature of the point where the hull side joins the stern – but I do not understand the form it takes.

Looking at the overall survey it is evident that the area in the centre of the wreck to the west of the trial excavation is the main part of the wreck which has not been systematically surveyed. There is currently very little exposed timber in this area but there are substantial amounts of iron concretion. There is also now an area of exposed timber to the NW of the main area of wreckage – this has not yet been surveyed either, as it was not visible until August of this year. Hopefully these areas can be surveyed in the coming years.

[7] B Lavery *The Arming and Fitting of English Ships of War 1600-1815* London 1987

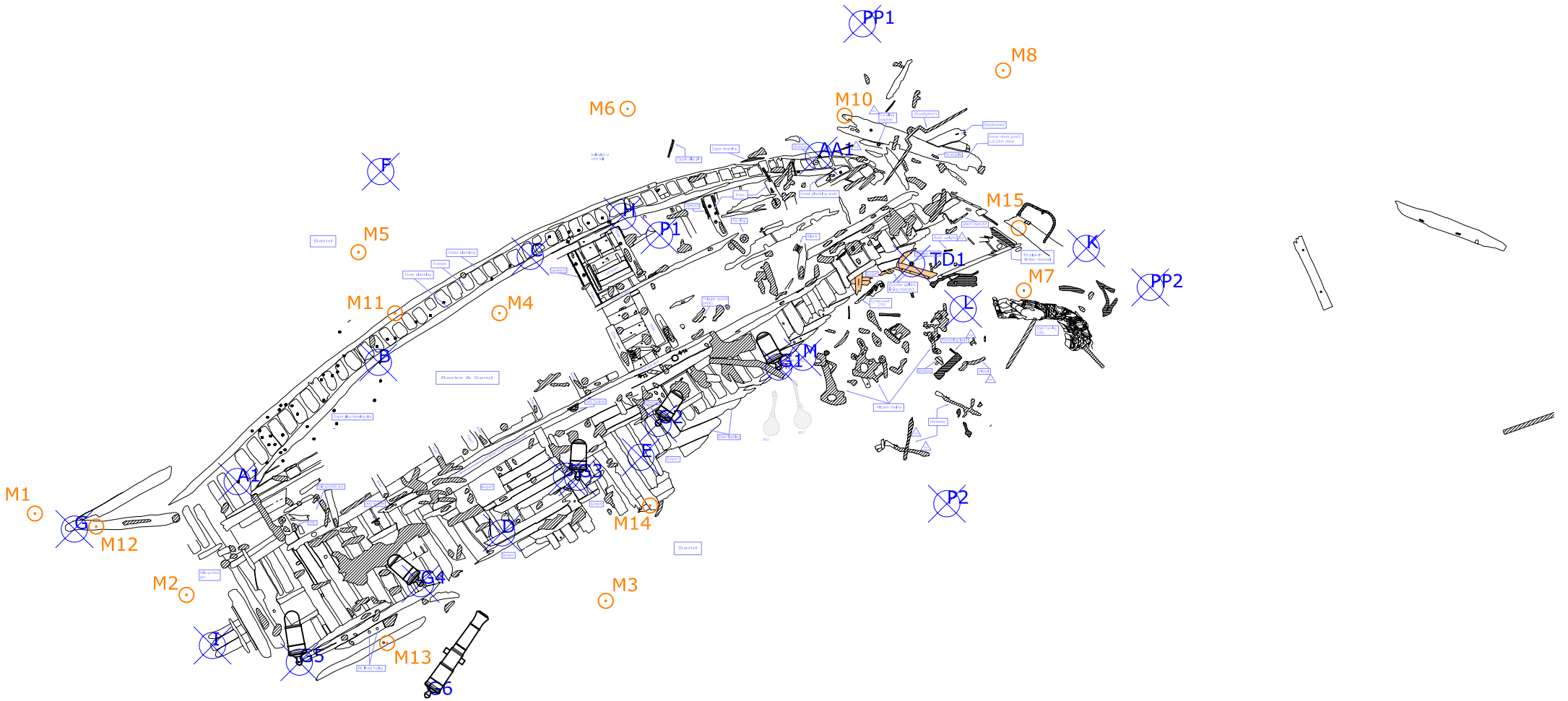
COLOSSUS August 03 Survey

Showing material drawn Aug03



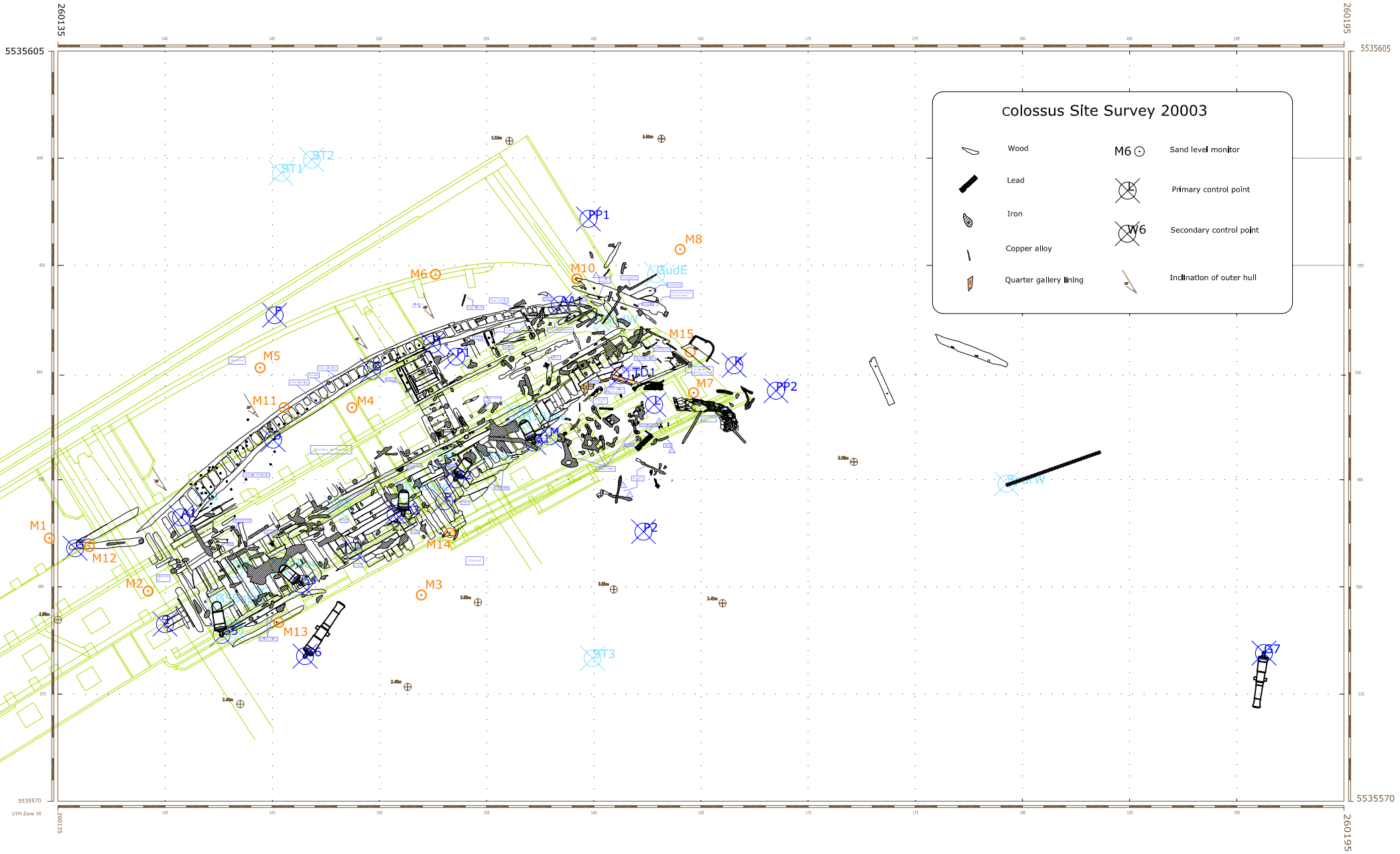
# COLOSSUS August 03 Survey

## Site plan with labels



# COLOSSUS August 03 Survey

# UTM Grid and Hull



## Notes on the AutoCAD files

There are two AutoCAD files included on the CD – one is in AutoCAD 2000 format and the other in AutoCAD 2004. The files are otherwise identical. All the survey conducted to date is in this file, but some of the layers are turned off to make viewing easier. For example, the small finds are all plotted by category but these layers are currently turned off.

The survey conducted this August is all contained on a separate layer named *Site Plan Aug03*. The annotations are on the layer *Labels Aug03*, which can also be turned off to get a clearer view of the survey.

# Site Visit August 2003

## Monday 11th August 2003

Two groups of divers visited the site. These were the divers on the two dive charter boats - Tim Alsop's and Jim Heslin's. After a brief introductory talk the divers were escorted around the site in groups of five; Tim Alsop, Anna Cawthray, Pete Holt and myself took one group of divers each. Some divers had travelled over especially from the mainland in order to take part in this site visit. No charge was made for this dive other than the normal boat charter. The area of the site stabilisation trials was not included in any of the escorted tours and all divers were asked to stay away from these.

## Tuesday 12th August 2003

The same two boats were used to take out 20 local divers - these were those divers who had expressed an interest in visiting the site. Once again the divers were given an introductory talk and all were told not to touch anything. The divers were escorted in small groups around the main areas of the wreck. Some dives took underwater photographs during their dive. Most divers were in the water for 50-60 minutes.

## The Impact on the Site

For the most part the divers were well behaved, although some problems resulted from divers moving kelp to get a better view of the timber. Unfortunately much of this kelp is attached to wreck material so some disturbance occurred. Some displacement of fragile timber also occurred through careless finning – this was not deliberate but some divers appeared to have poor buoyancy control. Only two cases of wilful disregard of the request 'not to touch' occurred. One individual was unable to resist hitting the gudgeon pin with his somewhat oversize dive knife to see if it was iron or 'brass'. Another persistently picked up and turned over every artefact he encountered.

Overall the damage to the site was fairly minor and was probably justified by the good will and the need for public access. But it should be remembered that this was an escorted site visit – the impact would be much greater on unescorted visits. Unescorted visits would probably have a disastrous effect on the ongoing stabilisation trials. Moreover frequent visits would definitely have a deleterious effect on this fragile site. I would suggest that a few escorted visits a year would probably achieve the best overall balance at the moment.

# Stabilisation Trial – Progress Report October 2003

Work on the sample and data retrieval began on 20th October 2003. Everything went smoothly and in accordance with the project design.

## Visual Inspection

The equipment and samples installed in May 2003 were all still in place and in good order. Inspection of the three mats showed that once again none of them had attracted any significant amount of sediment.

*V0 – Control*
All control blocks were still in place. There is now even more marine growth attached to the blocks but no measurable change in the seabed level around the control blocks.

*V1 – Terram 4000*
This mat was still in place. The seaweed growing on the mat has increased in density and height; this is now 0.15 to 0.20m in height. The depth of sand lying over the mat is now up to 10mm deep in places.

*V2 – Debris Mat*
The mesh is still in place and continues to be covered with weed growth. There is still no measurable change in the level of sediment in the area of this mat.

*V3 – Floating frond mat*
This mat was also still in position. There is now kelp as well as fine seaweed growing on this mat. There was once again no measurable accumulation of sediment around the area of this mat.

*The area of the wreck*
The area of the wreck was covered with a thick layer of kelp, much of it attached to small boulders and lumps of iron concretion. Interestingly the copper alloy pins around the wreck had been highly polished (see photograph). This phenomena has not been observed before on the site since survey began in summer 2001. It is difficult to see what has caused this abrasion – possibly sand particles suspended in the water?

*Conclusions*
The disappointing performance of the mats noted in the August progress report continues. It will be interesting to see whether the winter storms will alter the situation.

## Sand level monitoring

Sand monitor levels taken 21st October 2003 – all heights are in millimetres.

| Monitor | Position | Height above the seabed (mm) | Change since August 2003 (mm) |
|---|---|---|---|
| M1 | 260134.63 / 5535582.30 | 35 | +65 |
| M2 | 260139.21 / 5535577.81 | 25 | +75 |
| M3b | 260154.79 / 5535577.27 | 90 | +10 |
| M4 | 260148.74 / 5535588.34 | 110 | -10 |
| M5 | 260144.43 / 5535590.22 | 95 | +5 |
| M6 | 260152.61 / 5535594.58 | 43 | +57 |
| M7 | 260164.66 / 5535589.07 | 80 | +20 |
| M8 | 260164.05 / 5535595.79 | 80 | +20 |

Additional sand monitor points installed August 2003 – all heights are in millimetres.

| Monitor | Position | Height above the seabed on 28/08/03 | Height above the seabed on 22/10/03 | Change |
|---|---|---|---|---|
| M10 | 260158.94 / 5535594.51 | 10 | 0 | +10 |
| M11 | 260145.54 / 5535588.37 | 51 | 39 | +12 |
| M12 | 260136.34 / 5535581.65 | 11 | 42 | -31 |
| M13 | 260145.30 / 5535578.35 | 24 | 19 | +5 |
| M14 | 260153.30 / 5535582.53 | 42 | 33 | +9 |
| M15 | 260164.26 / 5535590.60 | 95 | 80 | +15 |

Once again the sand levels seem to have risen slightly except at points M4 and M12, where they have fallen slightly. The inevitable conclusion is that sand is moving around the site. Overall these results present a fairly consistent picture. As noticed in August this year the sand levels at the western end of the wreckage now appear to be consistently rising. The master control block, MC3 deployed in August 2003 is now almost completely buried by sand (see photo). However at the eastern end (stern) of the wreck the timber is still exposed above the level of the seabed, with little sign of any increased sand level. The master control block at the eastern end MC1 is, if anything, slightly more exposed now than it was in August when deployed.

## Timber sample retrieval

The oak and pine sample blocks were retrieved from each of the test areas. These were then labelled, packed into a cool box with ice packs and dispatched to Mark Jones at MRAS by 24 hour courier. Mark Jones will undertake the analysis of the timber sample blocks and the associated data from the datalogger.

Timber samples recovered October 2003

| Sample | Type | Location | Deployed | Retrieved |
|---|---|---|---|---|
| P2 | Pine | V0-B (Control) | 13.V.2003 | 21.X.2003 |
| O2 | Oak | V0-B (Control) | 13.V.2003 | 21.X.2003 |
| P7 | Pine | V1-B (Terram) | 14.V.2003 | 21.X.2003 |
| O7 | Oak | V1-B (Terram) | 14.V.2003 | 21.X.2003 |
| P11 | Pine | V2-B (Mesh) | 14.V.2003 | 21.X.2003 |
| O11 | Oak | V2-B (Mesh) | 14.V.2003 | 21.X.2003 |
| P21 | Pine | V2-A (Mesh) | 19.VIII.2003 | 21.X.2003 |
| O21 | Oak | V2-A (Mesh) | 19.VIII.2003 | 21.X.2003 |
| P15 | Pine | V3-B (Fronds) | 16.V.2003 | 21.X.2003 |
| O15 | Oak | V3-B (Fronds) | 16.V.2003 | 21.X.2003 |

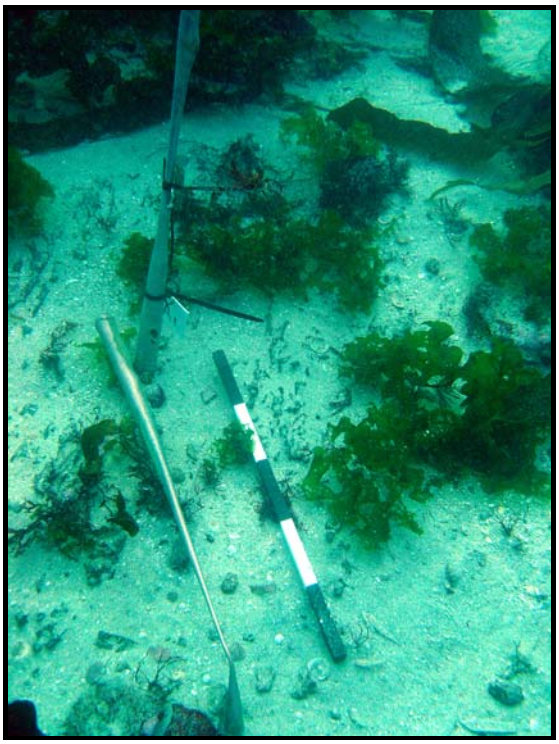
## Sub-sea datalogger

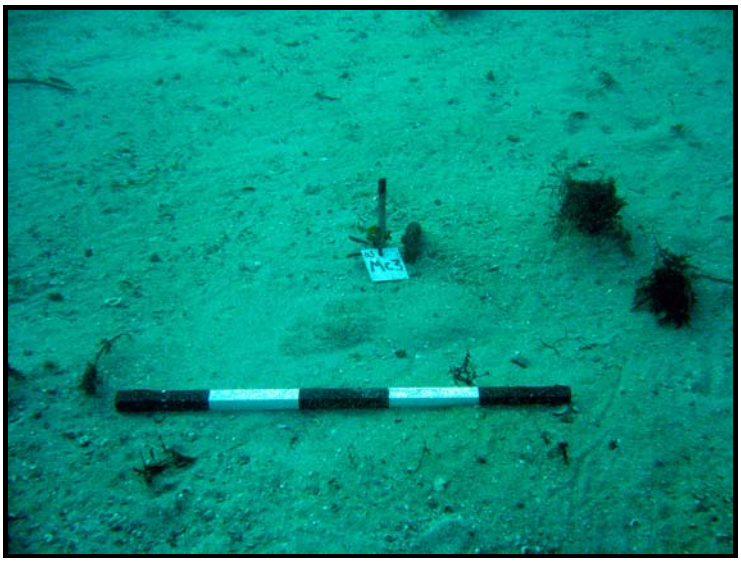
The data logger and probes were retrieved from the area of the mesh mat V2 where they were installed in August this year. The data was downloaded and is included with this progress report as an Excel file. The datalogger will not be deployed again until April-May 2004 – this is because of the difficulties of retrieval in the winter months and the chance of damage to the unit during the winter storms. Before the datalogger is redeployed next year it will be serviced and recalibrated by the manufacturers Euxsys of Camelford.

The data set collected will be analysed by Mark Jones of MRAS. Comparing this dataset with that taken from under the floating frond mat V3 earlier this year it is apparent that the levels of dissolved oxygen under the mesh mat were considerably higher. As neither mat had accumulated any significant amount of sediment this difference can only be due to the geotextile layer upon which the frond mat is based. This perhaps augers well for the performance of the Terram mat, which will be measured in the early part of next year.

## Exposed timber of the wreck

The timber exposed at the stern of the wreck, particularly on the south side, is now standing some 0.25m above the seabed. This timber was all resurveyed in August this year (see Survey August 2003). This timber is very vulnerable to any storm surge on site this winter so it was consolidated by placing a row of sandbags against the southern exposed edge (see photo).



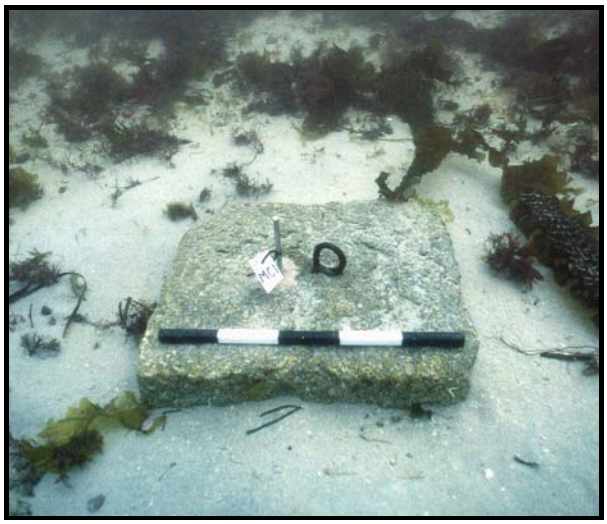


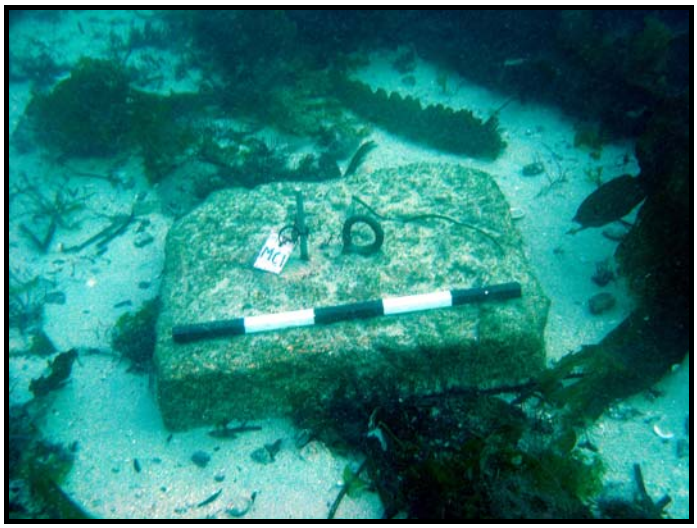
Above : Master control block MC3, deployed in August 2003. By October the granite block had been covered with sand.

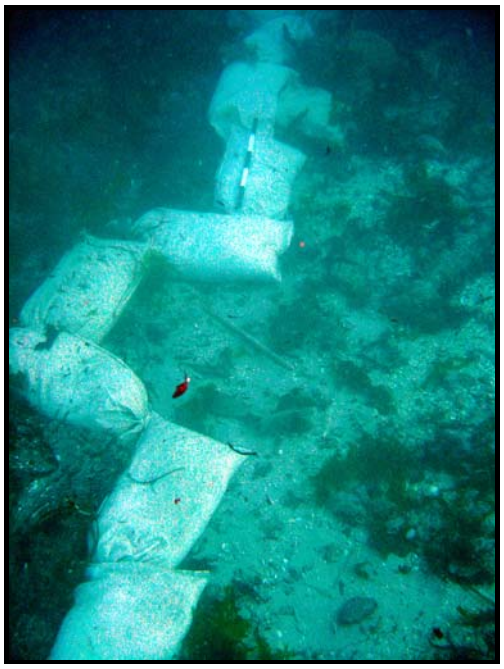
Left : Copper fastening pins by control point A1 – showing the polishing of the copper

**October 2003**

Below : Master control block MC1, after installation in August 2003 (below left) and in October 2003 (below right). Notice how the sand level has dropped slightly since August.







**October 2003**

Above: Sandbags placed along the southern edge of the timber at the stern.

Below: Copper alloy fastening bolt by gun port zero showing the polishing of the copper.