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Es el diario del Constructor Commander R. K. Pudduck, quien se desempeñó como Inspector/Asesor sobre los daños producidos a los buques británicos durante el conflicto de Malvinas.

THE FALKLANDS: THE DIARY OF A NAVAL CONSTRUCTOR

By Constructor Commander R. K. Pudduck
Ceng, MRINA, RCNC Fleet Naval Constructor Officer (1982)

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THE FALKLANDS: THE DIARY OF A NAVAL CONSTRUCTOR

By Constructor Commander R. K. Pudduck, CEng, MRINA, RCNC
Fleet Naval Constructor Officer (1982)

This article is reprinted from the January 1983 edition of Review of Naval Engineering, as a reminder of the engineering efforts made by those who fought on, under and over the South Atlantic in 1982.

This narrative is taken from the Report of Proceedings by the author, who was despatched to the South Atlantic to advise on aspects of hull strength, stability, and action damage. It is written in the form of a sea diary and includes many personal observations and first impressions made on the spot. With hindsight and knowledge not available at the time, several mysteries can now be explained. Because of the needs of security, many details have inevitably had to be omitted.

It was decided that I should travel south in Canberra, transferring to Hermes when an opportunity was presented. On the way I could oversee the completion of the helicopter decks by the twenty-six Vosper's workmen who went as far as Freetown.

On arrival at Ascension on 20th April, CTG 317.8 had sailed on, perhaps two days previously. Three weeks were spent there until events suddenly escalated from the recapture of South Georgia on 25th April, the sinking of Belgrano (May 2) to the attack on Sheffield (May 4). Canberra at last departed from Ascension on 5th May.

We had joined up with the main body on the night of 17th May and the following day I transferred by Wessex to Hermes. The ship had been in Condition Zulu since leaving Ascension, ie both at Action Stations and in Defence Watches every hatch was fully clipped and all WT doors had at least two clips. In moving to State 1, the ship opened up to allow rapid movement of people to their Action Stations; this was achieved on average in less than eight minutes. If there was no time to allow this, the order was given: 'On Anti-Flash and Stand to'. People then stayed where they were and took cover.

Having established my base in the flagship, I flew by Lynx to Arrow, at the time patrolling 120 nautical miles East of Stanley at 20 knots in a heavy swell. Her deck was only just in limits with the sea lapping the deck edge as she rolled.

About eight 30mm cannon shell holes from an A4 Skyhawk made a diagonal line along the port side through the Tyne intake, GW crew's shelter, the Cheverton, its davits, and the funnel. Apart from the initial 3-inch hole, these bullets caused surprisingly little damage – appearing to have exploded on impact with only buckshot like shrapnel coming inboard. This was to be fairly typical of all cannon shell impacts seen subsequently – even against steel structure only lucky shots caused serious damage, although steel splinters often caused injuries. Arrow had also suffered considerable hull damage caused during firefighting and rescue operations alongside Sheffield. Several frames were broken and aluminium deckplates split.

My next call was to HMS Glasgow, reached on 19th May. The faces of all of the ship's company bore expressions of shock and fatigue. When I met them they were just

beginning to draw breath after a tremendous recovery operation and could appreciate their extremely close call. Consider the way the 1000lb bomb neatly pierced the side hardly touching frames or longitudinals; how it knocked over the HP air bottle without fracturing it; why it did not get stopped when it hit the fuel filling trunk edge-on; and how it exited without exploding! There was no fire and the watch keeper who was doused in diesel as the bomb smashed the ready-use fuel tank must indeed have a charmed life.

Glasgow's damage control party made a good first-aid repair using bedding, engine-room floor plates, and timber. There is not much to shore against in the AER. With green seas coming through holes 2 – 3 ft across in both sides of the compartment every time the ship rolled, the water rose to 5 ft above the lower floor plates. 'Once-Only' suits were used to good effect but were easily holed



Figure 1: HMS Sheffield shortly after being hit by an Exocet missile

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and the near freezing water was causing hypothermia. *Invincible's* shipwrights arrived to bolster flagging efforts and reasonably good plate patches were fixed using Ramset, welding, and an ingenious method of wedging off the hull frames.

Great efforts were made to restore LP and HP air, fuel and FW lines. A firemain riser was cobbled up out of a section of fuel filling pipe, and there was a good prospect of making a jury intake for one Tyne.

Whilst it was appreciated that *Stena Seaspread*, the forward support ship, could have largely restored *Glasgow's* propulsion machinery, it would have meant, at that stage, going to South Georgia to find calm water. *Glasgow* would have been away for about ten days but, more importantly, *Seaspread* would have been unavailable to give speedy assistance to other customers who were beginning to form a queue. There was a need to make quick turnaround repairs for those ships capable of rejoining the firing line. WE defects received highest priority. Unfortunately *Glasgow* was beyond short term repair and I supported the decision to send her home.

From HMS *Glasgow* I moved on to *Alacrity*. The weather had worsened in the last twelve hours and *Alacrity* was bucking fast in a rough following sea. She exhibited typical first-order Type 21 01 Deck passageway cracks, but otherwise appeared to be in good order.

Helioed back to *Hermes* in *Alacrity's* flight – first Lynx into Falklands, shot up by innocent looking fishing boat whilst attacking patrol boat on 2nd May. Bullets went through fuel tank, tail-rotor drive shaft, and window strut behind pilot's right ear!

Gloom and despondency in *Hermes* at the waste of life and talent when *Sea King* carrying thirty SAS crashed whilst making the last transfer of the night to *Intrepid* on 19th May. In the urgency to rescue them, the wires of one of *Hermes's* LCVPs fouled on the winch drum

and was almost cut through. At this time *Hermes* had two unserviceable LCVPs.

Friday 21st May (D-Day) – The day's events are well reported elsewhere. Suffice to say D-Day seemed a qualified success. On the plus side, the transports disembarked the troops without loss and enemy defensive positions were quickly cleared. There was enthusiastic talk of 1 Chinook and 2 Pumas shot up on the ground. The CAP have been our salvation. At 1830 the tally was 18 enemy aircraft shot down, with the probability that a few more Mirages, forced to use re-heat, would not get home.

On the debit side, the defending warships suffered badly: *Ardent* gone, *Antrim* and *Antelope* with UXBs, and *Brilliant* with damage to the *Seawolf* system.

Reaction here at the end of the day was:

- (a) Thank Goodness the AAF got it wrong and went for the escorts'.
- (b) 'Hurrah for *Seawolf*! When is *Seadart* going to score?'
- (c) There is a generally expressed respect of the Argentinian pilots by those ships attacked. Their losses have been high but their nerve rarely broke.
- (d) Anger at the World Service News announcement (presumably via MOD) that so many enemy bombs had not exploded. This must have told them that their fusing was wrong.
- (e) All our ships seem poorly protected against bombing tactics. More AA armament should be fitted; small arms and Oerlikons have been as successful as any missile system in the AOA.

Being under fire concentrates the mind on self-protection measures. In *Hermes* we evacuated 5 Deck and below at night. There were also thoughts of clearing 4V section at

the stem. As in any aircraft carrier, the need to keep the ship upright for flying after damage is paramount. The only sensible counter was to keep most of the wing tanks full. However, this conflicted somewhat with the operational requirement to be at 30 minutes' notice to RAS. Intact stability was not a problem, indeed *Hermes's* flight deck was less often out of limits than was *Invincible's*.

22nd May. I visited HMS *Invincible*. It made an interesting contrast to *Hermes*. This ship, with a proportionately small crew, said it was not practicable to fight damage in State 2 Zulu, neither could the ship's company move quickly enough from State 2 to 1 at Action Stations. It was therefore elected to live in State 1 Condition Zulu whenever enemy activity was threatened. In practice this means several large hatches were open in Defence Watches and many of the off-duty watch slept at their Action Stations.

The ship had tested many materials in accommodation areas, subjecting them to an oxy-acetylene fire test and by shooting at them with a general purpose machine gun to see if they splintered. Vinyl seat cushions in the Wardroom were rejected as inflammable and stacked on the Flight Deck. Aluminium-backed formica-type panelling was found to be both fire and splinter proof.

From *Invincible's* experience in assisting *Glasgow*, it was clear that shipwrights, or at least experienced Hull Adquats, with good welding proficiency are a scarce but valuable commodity in times of war. In order to save a modern ship from disastrous flooding in rough seas, holes in the hull must be quickly and securely plugged. A bodged job will not hold. DC blanks are too small. Shorting is useful to hold up decks but difficult to obtain any inboard purchase to apply pressure against the shell.

There should be more welding machines carried in ships. It will not always be possible to rely

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Figure 2: HMS Antelope limps into San Carlos Water: entry hole of unexploded bomb is visible below funnel

on a nearby larger ship to give speedy assistance. The two welding machines left by Vospers in Canberra were obtained to be held pro tem. In Hermes.

The next ship visited was *Antrim* – another near disaster. The bomb entered from green 135 whilst the GWS Seaslug launcher was trained to port. It neatly pierced the right Seaslug flash door, crossed the top of the port discard bay missing an armed Seaslug by 3 feet, through a fan compartment, smoke locker (pyros were flattened but did not cook off), demolished the calorifier, and entered the junior rating's heads. It deflected up to dent the underside of the flight deck and fell back onto the vitreous tiles. The Grinnell sprayheads were severed causing a flood in the Seaslug loader and traverser spaces.

Fortunately there was no fire and the only casualties were caused by shrapnel from approximately forty cannon shells. The bomb was lifted out through a hole cut in the flight deck, trolleyed across to the starboard GP davit, and lowered gently over the side. Priority was to plug the flash-tight door and restore the left Seaslug barrel by making a few hydraulic pipes. The right barrel could not be restored mainly because of the difficulty of rail realignment in the vicinity of the broken door. Cannon holes were plugged.

On returning to *Hermes* there was concern over *Antelope* which had been hit by two UXBs. *Arrow* was sent to San Carlos to replace *Antelope*, and the calmer water

there would reduce the strain on her damaged hull. Later – bad news that one of *Antelope's* bombs had exploded whilst being defuzed.

Antrim due next to go to *Stena Seaspread*, then *Glasgow* in three days, followed by *Brilliant*.

Monday 24th May, heloed in *Wessex V* to *Brilliant*, but aircraft went U/S on the way and forced to put down on *Atlantic Conveyor*.

Air Raid Red whilst in the middle of lunch – I refused the doubtful sanctuary of the wardroom bar, with its sellotaped windows and chintz curtains, choosing to lie on the deck in a centre passageway. The superstructure was like a seven-storey aluminium, glass, and plastic block of flats. Only a few of the crew were seen carrying survival kit – mostly it was stacked at their Action Stations, a fatal procedure. A new aircraft took me on to *Brilliant*.

Brilliant had suffered cannon damage – twenty holes in the starboard side from waterline below the bridge to the funnel. Wooden bungs hammered in from inboard made adequate watertight plugs. (But there are no round bungs in the Rate Book now!). Some severed high-value cables had been temporarily spliced. *Stena Seaspread* should be able to make a better job using in-line crimps. There did not appear to be any shock damage from near-miss bombs.

Fortunately the Argentinians could be relied upon not to come out at night. Hence vessels moved in and out of the AOA at night (transports

with escorts); during daylight all ships were either kept outside the range of mainland based S. Etendards or within the shelter of San Carlos. Routine dawn action stations were sounded at around 1030Z in *Hermes*. Attacks in the AOA seemed to commence at approximately 1200, peak at 1300 and then tail off. Another peak often occurred at about 1900.

25th May. A busy evening. After a brief respite, another attack was launched at the Carrier Group. At 1800, 'Super Etendard' warning with the Action Stations alarm. High tension for thirty minutes, then with no further reports of aircraft near we relaxed to yellow. Sudden news of *Coventry* hit midships by two bombs and in danger of capsizing. Then *Broadsword* hit aft. *Coventry* listed 70° in fifteen minutes.

26th May. At 19 30 *Atlantic Conveyor* hit by two Exocets. Forty-five survivors brought to *Hermes* from *Atlantic Conveyor*, mostly heloed direct from the fo'c's'le. Some personnel lost their lifejackets because they were not tightly secured when they jumped into the sea. Few had warm clothing and hypothermia certainly took its toll. *Alacrity* and *Brilliant* assisted in the rescue, but fire fighting efforts were useless. By next day she was a smoking wreck with explosions continuously tearing her inside out.

Better news later that *Broadsword* was only slightly damaged by a bouncing bomb which came up through the starboard side and out through the flight deck. The only casualty was a Lynx, on deck at the time.

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Figure 3: Atlantic Conveyor burning after being hit by an Exocet missile

The loss of Coventry caused some mystification here. Many people naively expect ships with longitudinal WT bulkheads, always to sink on an even keel. The number and precise location of the bombs was not known at the time. The state of hatches and doors may turn out to be significant.

27th May. Heloed to Brilliant en route for repairs with Stena Seaspread in the Tug and Repair Area. Arrived at midnight. A workforce was organized to provide round the clock shifts to get Brilliant back to the Battle Group as soon as possible.

A Tyne engine lifting beam was adapted to make a strengthening girder for Arrow's hull cracks. The welding could not be done in the time Brilliant was alongside so it was arranged to send it on by the next visiting ship. Some steel plates and bottled gas were transferred for Hermes or possibly to be passed on to Fearless. Fearless's request for a team to be detached for repairs to ships in the AOA would have reduced Seaspread's capability on station. However, rather than send the whole ship into a risky area, this request would probably be met. Having patched up the cannon shell holes and spliced some severed cabling, Brilliant steamed back to the CVBG and Active moved up to provide Seaspread's next task.

Concern about HMS Argonaut. Of the two bombs which hit Argonaut, one in the boiler room, one in the Seacat magazine, the latter was

the most troublesome. This bomb entered from the port side about 5 feet below the waterline, through the dieso storage tank in D Section 4DK, across the sonar compartment into the starboard dieso tank, and finally into the Seacat magazine. Fire broke out there but the Inrush of cold dieso backed by seawater flooded the magazine and effectively quenched it. After several unsuccessful attempts to plug the main hole, Fearless's shipwrights eventually cured it with an external tailored steel plate secured inboard with strong-backs. It was not possible to defuse the bomb in place so it had to be lifted out carefully. Slots were cut in two decks and it was hoisted up and fletted out through another hole cut in the ship's side. Intrepid assisted at this stage – the teams carrying out this work had to continue through air raids.

On her way out of the AOA, the temporary plug forward got washed off. She turned to go back but found steaming into the weather made the flooding worse. Argonaut therefore returned to her original course towards Stena Seaspread. Fortunately, the weather moderated and Stena Seaspread succeeded in re-securing the plug, and Argonaut eventually headed for home.

1st June. Having some responsibility for Arrow being confined to Bomb Alley, I felt obliged to see the repairs completed. Active took in 14 FMG personnel from Seaspread requested by Fearless for repairs to various ships in the AOA. I was flown in at

dead of night in company with the new Commanding Officer for 2 Para. A journey of two hours through Indian country by Sea King which I did not enjoy.

Fearless, probably in common with the other ships in San Carlos at this time, was at Action Stations from dawn until dusk. Proceeded to Arrow and met the FMG team who were well underway fixing the girder to the deck. Canberra disembarking 5 Bde all day. This was D-Day 2 (2 June) when another big effort might have been expected from the AAF but it never came. Low cloud cover today provided some protection from air raids but similarly made conditions difficult for our helos.

Visited *Sir Lancelot* which had been abandoned after being hit with two UXBs on 24th May. The devastation caused by these bombs made it hard to believe they hadn't exploded! However, there was no fire and, apart from a lot of severed cables, broken firemain, and diesel uptakes, there was every hope of being fit for normal duties within a couple of days with help from Seaspread's men.

M.V. *Monsoon*, a coaster belonging to the Falklands Islands Company had been recaptured and I accompanied a small team of engineers and clearance divers from Fearless to carry out a survey at Goose Green.

7th June. Arrow moving vigorously on her way out of Falkland Sound towards the CVBG, after fifteen days in San Carlos water. I examined the repaired cracks several times during the night and there were no signs of movement. Passed Uganda in the night lit up like a fairground.

Back in Hermes, boiler cleaning was underway and other ships were thinking of self-maintenance. *Invincible* complained of a slippery deck, blamed for the loss of a Harrier recently.

8th June. Air Raid Red 1700 in TA. *Plymouth* hit aft and burning but, later, fires under control.

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Figure 4: HMS Plymouth's funnel damage by 'something' that hit her during the action on 8th June

Visited Plymouth 9th June. Another case of UXBs. One passed through the crew's shelter, aft of the mortar. The second entered the mortar handling room 10 feet above the waterline, was deflected up through the loading compartment, struck the mortar, and flew away over the starboard side. There was no fire or explosion. Apart from patching the ship's side, the most serious problem was live, shocked mortars in the crimped barrels and others trapped on their racks by seized doors.

The second area of damage was caused either by shrapnel or by another bomb striking a depth charge which exploded on the starboard edge of the flight deck. This slightly damaged the Wasp and caused a serious fire in the PO's mess below. The fire spread into the junior ratings' dining hall and passageway, before being extinguished by determined efforts by the fire parties. The fire damage was mainly cabling insulation. It took time to isolate and provide enough emergency leads to the after end services, and a number of minor electrical fires broke out sporadically for some hours after the major fire had been extinguished.

Plymouth also suffered some cannon and shrapnel damage, especially to the funnel casing which was badly holed, and in the 4.5 turret. Seaspread assisted with cleaning up the fire damage, restoring firemain, and making the electrics safe.

The Captain was keen to get his guns serviceable and join the NGS line as soon as possible. At this stage availability of 4.5 mountings of either mark was becoming low, but the Admiral's intent was clear – repairs must be based on restoring

the ability to float, move, and lastly fight. Plymouth was required for only one more night's NGS – the ship would have little capacity to absorb further punishment.

12th June. Glamorgan hit by suspected Exocet 0630 today. I transferred at noon to survey the damage. The damage to Glamorgan was arguably the most severe of all sustained by Task Force warships with the exception of those ships which subsequently sank. The explosion blew a hole in the weatherdeck approximately 20 feet by 8 feet with the longer dimension in the direction of the missile's approach, Red 150. The explosion plainly took place on the deck, blowing down into the galley, forwards along the waist, and inboard into the hangar. A fuel explosion in the hangar blew the doors and the already unseated Seacat launcher over the side. The Wessex, containing much magnesium together with its fuel and small arms ammunition caused a fierce and hazardous fire taking two hours to extinguish. Success in controlling the fire was largely due to the ship's ability to provide quickly a considerable quantity of AFFF treated water. Accepting the theory that this was an Exocet fired at extreme range, there was no billowing smoke from unspent rocket fuel, and the major fire burnt on the open deck. Blast damage was considerable, reaching up to indent the port

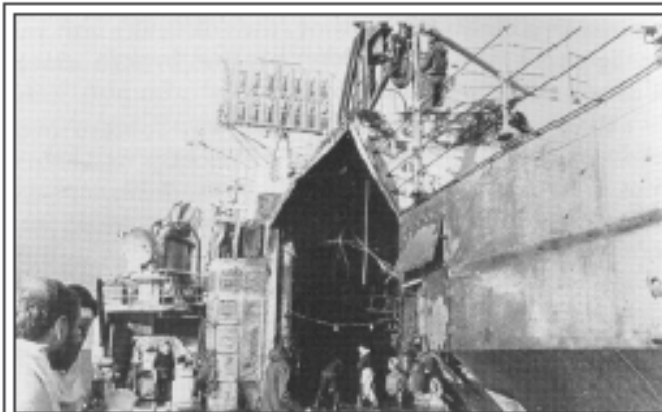


Figure 5: HMS Glamorgan shortly after being hit by land-launched Exocet. The hole in the galley deckhead has been covered with plywood sheets

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Figure 6: HMS Exeter being serviced by Stena Seaspread: the 100 ton crane in use. Note air filled Dunlop fender

after quarter of the after funnel, and shrapnel damaged STWS tubes and holed the Cheverton. A fireball went down through the GT intakes and entered the GTCR and gear room causing sooting but no burning. In the galley the major damage was caused by blast and shrapnel. Casualties were heavy, caused by sharp flying metal, ceramic tiles and razor-edged silvers of formica. Although Glamorgan was in Defence Watches 2Y, the number of casualties would probably not have been less in 1Z since the cooks and stewards formed a first-aid party whose action station was in the passageway immediately adjacent to the galley – an area similarly devastated.

A two-foot diameter hole in the galley deck above M2 breaker room allowed firefighting water to flood down to 3 Deck passageway and 3R mess. Together with the flood in the Seaslug magazine caused by shock-fractured spray main, the ship at one stage developed an 11" roll.

With assistance from Stena Seaspread, 60 per cent of the galley was ultimately made usable. The deck was plated over and repairs were made to the G6, ODGS,

auxiliary boilers, fridge plant, and upper-deck hydraulics. Rewiring of burnt cables to the 901 was progressed, and the starboard Seacat made serviceable and the Seaslug magazine dried out. The whole operation stretched Stena Seaspread's capabilities to the full.

The lesson which comes across from Glamorgan's experience is one of speedy fire fighting effort, plenty of water and good fortune! If it had not been for the deck edge dipping the missile as the ship turned away, the explosion and fire would have been internal, the Seaslug magazine might well have been breached, and the consequences disastrous.

Avenger has broken one propeller blade leaving a 15-inch stub. It is planned that Stena Seaspread will dive to recover a blade from Antelope and do the change afloat. The Red Cross have declared Stanley Cathedral a safe refuge for civilians. Signs are that the enemy are about to crack. C130 seen on air strip – Menendez about to leave? Some reports of white flags at 1500.

15th June. SURRENDER! Effective from 2359Z 14 June 1982. Dawn Action Stations in Hermes was

sluggish and the Commander had to remind the ship's company that the air and sea war was not yet over. The weather had deteriorated again; it was 2°C and a 50kt wind at this time, with no flying possible.

By the night of 15th, it was Force 10. I watched *Broadsword* at about one mile distant corkscrewing in a long-wave following sea. Occasionally the flight-deck with Lynx lashed on appeared to be swamped. Saw the propellers several times. I wondered how the Type 21s were faring?

16th June. Elected to join Yarmouth en route to South Georgia and South Thule. Yarmouth had first hand evidence of *Sheffield* sinking which provided some additional clues to the final condition of the ship.

I spent five days with *Antrim* at South Georgia, returning to *Hermes* on 26 June.

26th June. Back to *Hermes* – Now in 2Y but still occasionally exercising Action Stations to keep alert.

29th June. To Stena Seaspread in San Carlos to examine hull cracks in *Ambuscade*. The next major task for NP 1810 was to change *Avenger's* broken propeller afloat, for which special tools were awaited. Meanwhile *Exeter* came alongside for an AMP, *Anco Charger* provided fuel, and H.M. S/M *Onyx* intermittently berthed on the other side. Dynamic-positioning Dunlop fenders and the 100-ton crane were being put to good use.

Apart from during early career training, the Constructor in uniform does not often serve for long periods at sea. My contribution was perhaps small – like the surgeon one hoped perhaps one's services would never be required. In the event I found plenty of hot work and brought back some first hand evidence which I hope others will find useful. It was certainly an experience which I shall remember for a long time to come.

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