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Report on EESC Visit
to
ESVAGT
(Danish Offshore Rescue Service)

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SUMMARY

Reports of the rescue of personnel from the stricken drilling rig WEST GAMMA in August 1990 indicated that ESVAGT had accomplished a rescue in particularly hazardous conditions (Beaufort F9, 12 metre waves) where other rescue services had failed. The Emergency Evacuation of Offshore Installations Steering Committee (EESC) initiated a visit to the Danish rescue service ESVAGT to discuss this rescue. HSE/OSD asked MaTSU to report the findings of the EESC visit to ESVAGT.

Representatives of the EESG spent two days in the Danish field as guests of ESVAGT where they were given the opportunity of observing ESVAGT's procedures. It became clear that they have a particularly effective method for launching and recovering their fast rescue craft. This capability is fundamental to the integrated design philosophy of their relatively small stand-by vessels. There has been a high level of investment in the production and operation of the Danish stand-by vessels and in training their crews. Their effectiveness is probably a reflection of this investment and a concentration on performance capabilities rather than adherence to prescriptive requirements. A number of features in the ESVAGT philosophy of offshore rescue capabilities and procedures are worthy of further study and imitation.

The EESG are particularly grateful to the staff of ESVAGT for their cooperation in providing information about their organisation.

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1. INTRODUCTION

At meeting number 57 on 5 January 1992, the Emergency Evacuation of Offshore Installations Steering Committee formed a work-group to identify which offshore rescue capabilities require improvement in the UKCs.

The work-group comprised

J Lawson	IADC
A Bartholomew	BROA
J Gregory	UKOOA
D Robertson	MaTSU

At a work-group meeting in February 1992 it was confirmed that the capability of the fast rescue craft (FRC) and its crew were fundamental to the likely success of a marine rescue. It was also clear from the reports of the WEST GAMMA incident (August 1990) that the Danish rescue organisation ESVAGT had demonstrated particular skills in rescuing personnel from the sea in conditions where other rescue organisations had failed. It was decided to seek an understanding of ESVAGT's methods for training and motivation of their rescue crews together with the equipment and procedures they employ.

Capt. O Andersen, the joint-owner of ESVAGT, was contacted and proved sympathetic to the work-group's wishes and invited them to visit the ESVAGT vessels in the field. This invitation was gladly accepted and the following personnel visited the ESVAGT fleet during 29 April and 1 May 1992

M Lunt	OSD
D Robertson	MaTSU
N Groves	Mobil

This paper is a report on the observations made during those two days.

2. DESCRIPTION OF ESVAGT

ESVAGT was formed approximately 10 years ago to provide stand-by and rescue vessels for the Danish sector. After recently acquiring the stand-by fleet from SVITZER, ESVAGT are the sole stand-by operators for Maersk in the Danish sector.

ESVAGT currently own nine stand-by vessels (SBV) and have evolved a system whereby they remain self sufficient while on station. Crew changes for example, are undertaken independently from the offshore installation using ESVAGT vessels. This is feasible as the Danish installations lie approximately 100 miles offshore, ie within some 14 hours steaming time from the main port of Esbjerg. Crew changes are accomplished by fast rescue craft (FRC) marine transfers. The SBV remain on station for extended periods of over one year, one vessel has remained on station for 22 months. The SBV crews spend 14 days on duty with 2 days in transit to and from the field, with a 12 day rest period between tours offshore. Two crews man each vessel.

Due to the crew changing techniques evolved by ESVAGT, FRC launch and recovery has been developed to a high degree. ESVAGT personnel are highly motivated to provide a capable and professional offshore rescue service which can operate in the adverse conditions of the North Sea. The motivation to complete an offshore tour on a specific day also provides an incentive to develop techniques which are not strongly dependent upon prevailing weather. All of these factors have been fundamental to the development of their skills and facilities for rescue and recovery of personnel following an incident offshore.

3. SUMMARY OF THE WEST GAMMA INCIDENT

On 20 August 1990, the jackup drilling rig WEST GAMMA, with 49 personnel on board (POB), was on tow by the NORMAN DROTT and accompanied by the SBV STRILHAUGE, their position was approximately 55°20'N, 05°05'E. The weather conditions deteriorated rapidly and at about mid-day the helicopter deck was damaged and the tow-line parted. Two Danish SBVs were released by Maersk to also attend the drifting rig, the wind and sea condition was by now 55 to 60kts with 9 to 12 metre wave-height. The windage on the WEST GAMMA legs caused it to make some 5kts through the water, allowing some 18 hours before a risk of running aground. Evacuation of the POB by helicopter was not an option as the helideck was no longer available and the swinging legs made winching impossible. Evacuation by TEMPSC was not thought to be viable due to the rapid progress of the rig through the sea. The tow-line could not be reconnected and it was decided to let the rig drift through the night in the expectation that the sea conditions should improve and the tow could be re-established the following morning.

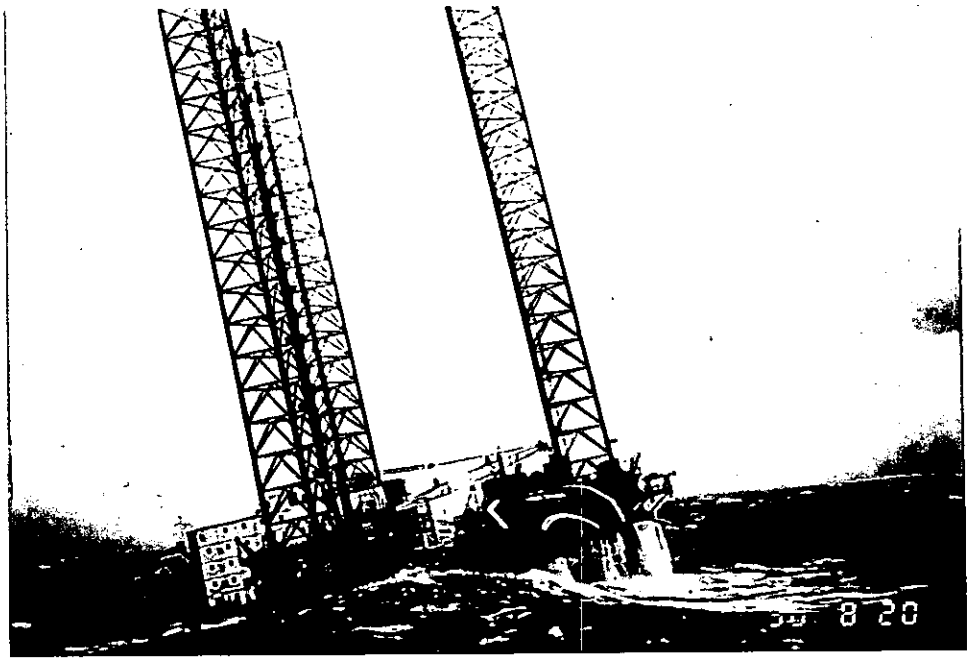

FIG 1 WEST GAMMA DRILLING RIG

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However, equipment had been broken free by the wave action and a number of ventilator shafts were sheared off allowing the seas to enter the rig. Stability was gradually lost during the night and the rig was in danger of capsizing. All personnel were dressed in insulated survival suits and life-jackets and at approximately 03.00 hours, the order was given to abandon the rig. The method chosen was for six people at a time, linked with a rope, to jump into the sea. The four FRC from the attending vessels would then recover these people. The winds had moderated somewhat to 45kts (F9), the seas remained at some 12 metres wave height. The FRC from NORMAN DROTT collected 10 survivors but could not be recovered in the prevailing conditions. During the recovery attempts, one survivor was taken on board with a rescue basket but the FRC was capsized. Nine of these survivors plus the two crew were subsequently rescued by the FRC from the ESVAGT OMEGA. In all 30 survivors were taken on board the ESVAGT OMEGA, 16 on the ESVAGT PROTECTOR, 4 on the STRILHAUGE and 1 on the NORMAN DROTT. One survivor is on record as saying, "I would like to praise the Danish rescuers. Nothing they did from start to finish could have been done better. I hope they will be rewarded in some way for their efforts, they deserve it". The WEST GAMMA capsized and sank approximately one hour after the order to abandon was given.

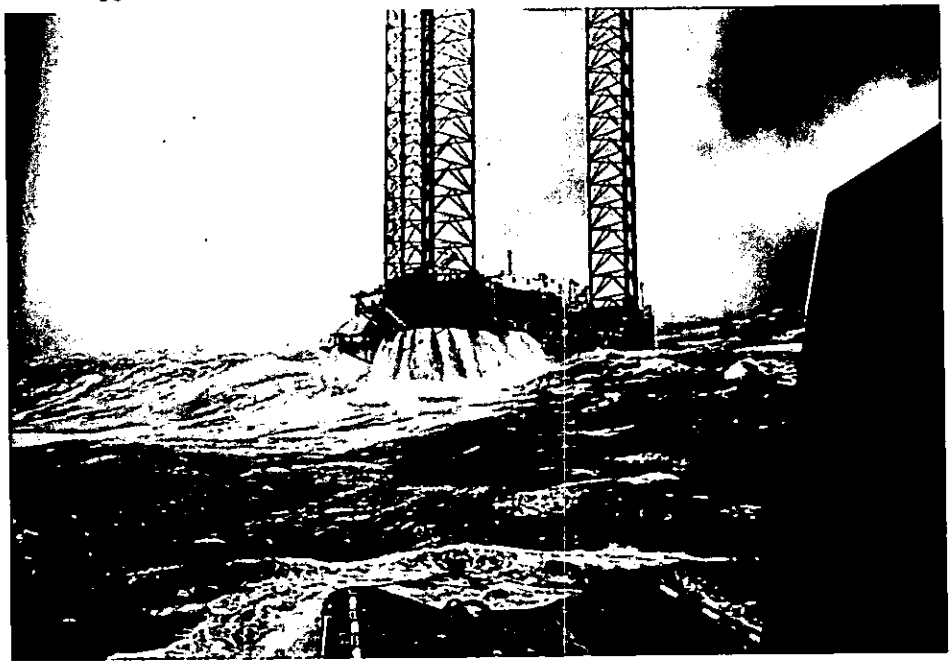

FIG 2 WEST GAMMA DRILLING RIG

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4. VESSELS

4.1 SBV DESIGN PHILOSOPHY

The development of SBVs in the UK sector have progressed from first generation converted trawlers through converted supply vessels to purpose-built rescue vessels. Generally the level of investment in the converted trawlers was low and many of the larger vessels have a dual capability, eg for field transfers of cargo, anchor handling, etc. Due to these factors the rescue capability of many UK SBVs are compromised to some extent. For example, FRCs are often mounted forward and high up on converted supply vessels in order to keep as much of the deck space clear. An example of this was seen in the vessel towing the WEST GAMMA where the long falls line from the high FRC recovery crane could not be re-connected to the craft. The outcome of this was that their FRC was eventually capsized and the survivors plus FRC crew had to be recovered from the sea.

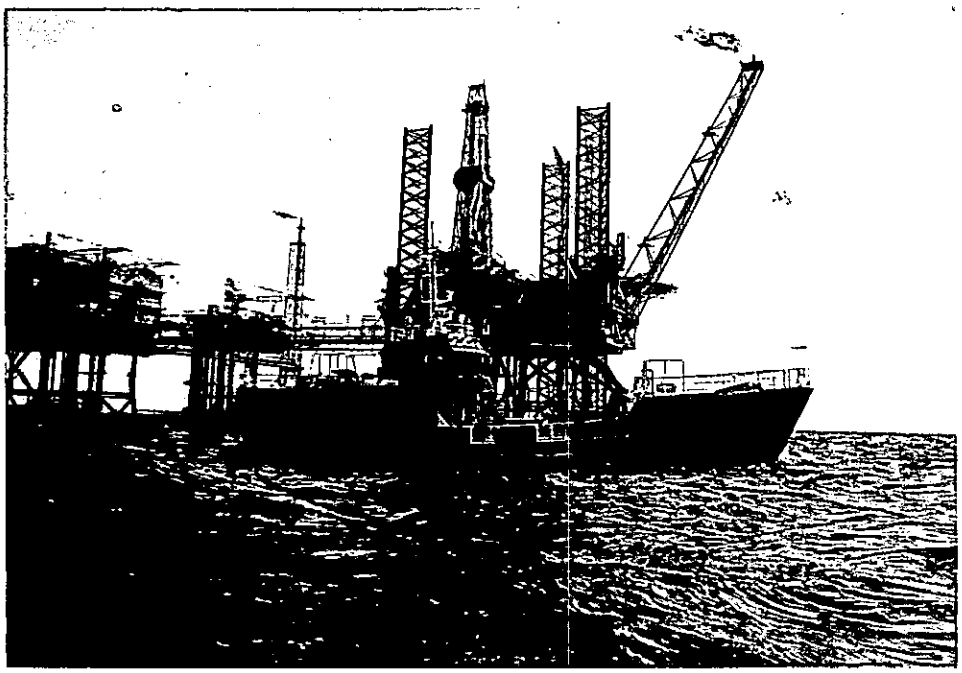

FIG 3 ESVAGT CHARLIE

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The ESVAGT philosophy has been to provide a vessel dedicated to rescue duties and not to compromise this capability with additional duties. The ESVAGT fleet consists of nine vessels, eight of which are converted trawlers and one a converted supply vessel. The trawlers are typically 33 metres length overall and some 250 tonnes displacement and all have been re-built to a standard layout. The level of investment in converting these vessels into an SBV was high, essentially involving a complete strip-down, new machinery and the installation of azimuth thrusters. The trawler hull was preferred as they are of a 'sea kindly' form designed to continue working in adverse sea conditions. The relatively short vessels have a less severe differential movement with the FRC than longer, hard chine hull forms. By cutting away the gunwhale it is possible to attain a very low freeboard enabling a quick recovery of the FRC with the minimum of crane wire deployed.

All the ESVAGT vessels showed a high level of maintenance even though many of them had remained at sea for a considerable period, eg 12 months.

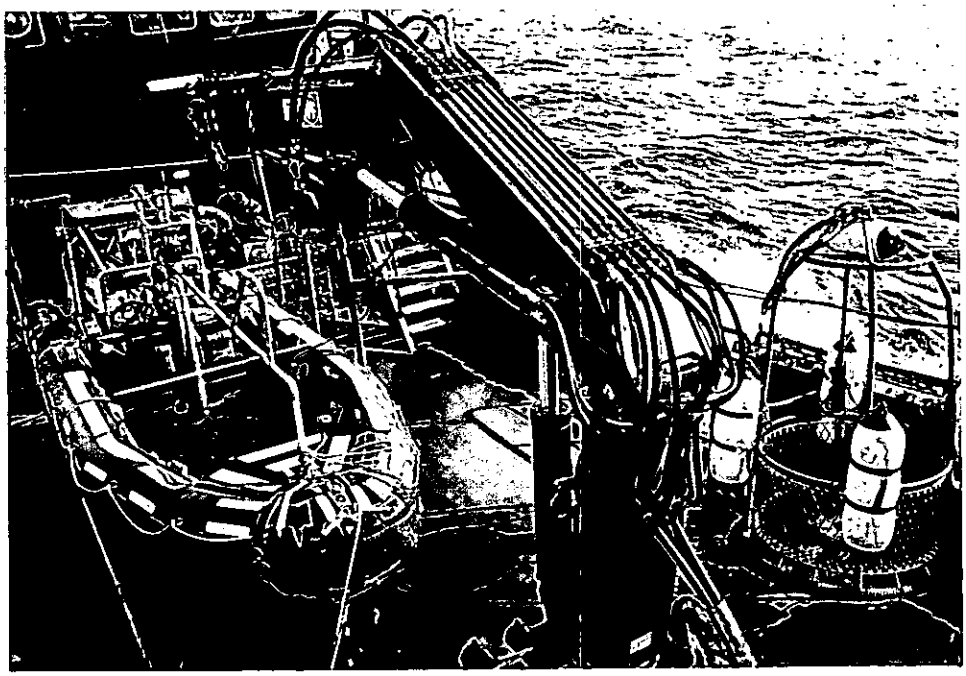

FIG 4 FRC RECOVERY CRANE

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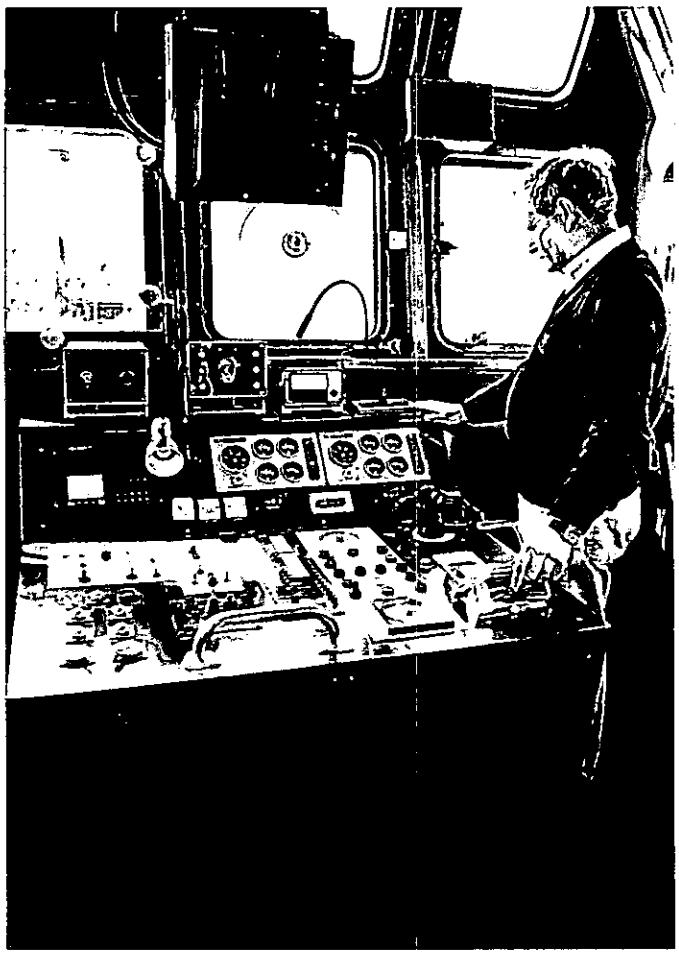

FIG 5 BRIDGE CONTROLS

4.2 SBV SPECIAL EQUIPMENT

Since the WEST GAMMA incident ESVAGT have up-graded the searchlights carried on their vessels. A 5kw light has been installed on each vessel operated with a joy-stick control in the wheel house. This light is in addition to two 2kw searchlights with manual controls together with five 1kw lamps to illuminate the deck and sea adjacent to the rescue area.

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The rescue equipment carried by the SBV was essentially the same as that deployed in the UK sector. One exception was that the ESVAGT vessels were equipped with a whaling gun, generally mounted amidships pointing aft. The purpose of this gun was to fire a towing line to an errant vessel not under command and threatening an offshore installation. The gun could fire a variety of objects, one of which was a butterfly bolt with a 26 mm wire rope attached. This bolt was said to penetrate a 16mm hull plate at 50 metres range and enable a tow to be established directly.

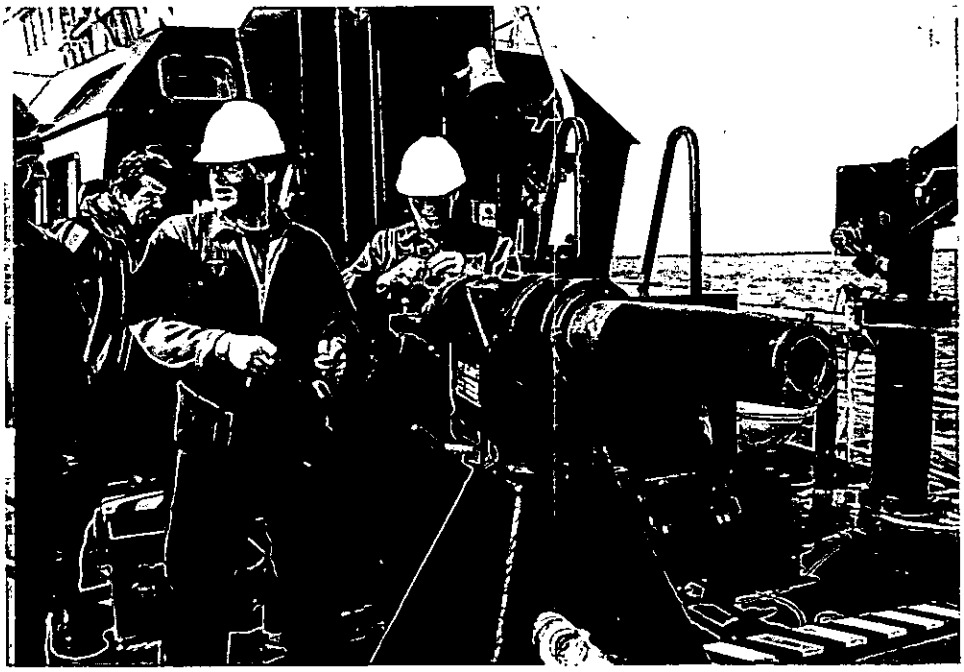

FIG 6 THE WHALING GUN

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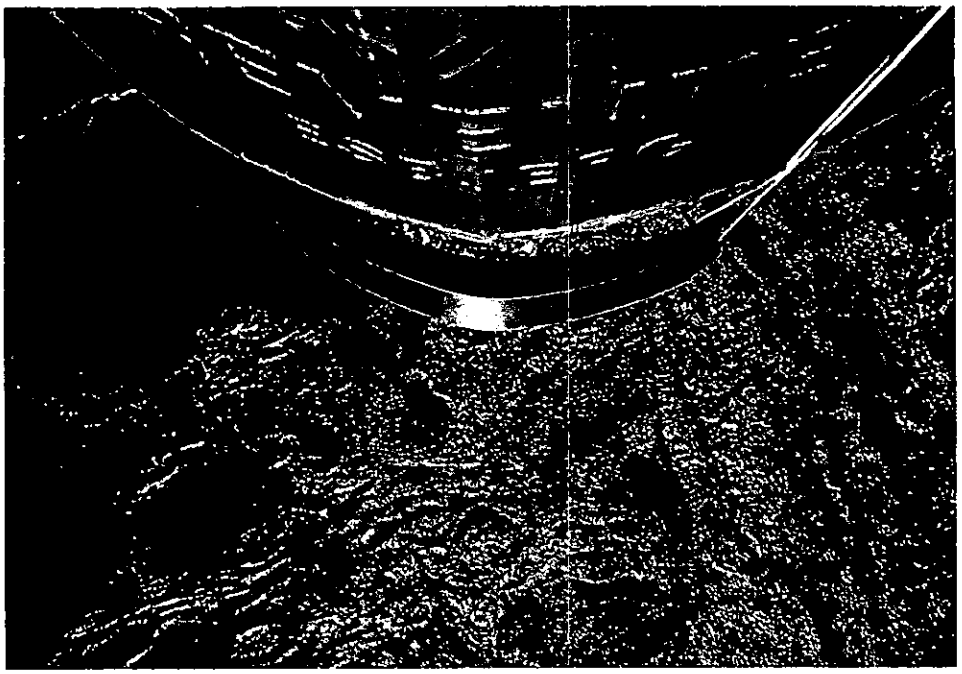

FIG 7 TOWING ATTACHMENT DEVICE

Once a tow-line has been connected to the errant vessel the tow is established with the aid of a fitting low down on the stern of the SBV. The location of this fabricated fitting ensures the stability of the SBV can be maintained.

5. CREWING

5.1 TRAINING

Primary SBV crew training takes place at the Danish Offshore Safety & Technology School on Fano Island outside Esbjerg. Some senior instructors are ex mates from ESVAGT SBVs. This initial training is then reinforced by regular training aboard the various SBVs. The aim of the training is that all members on board are competent to perform any of the rescue duties.

5.2 AGE AND MOTIVATION

The crews were generally comprised of fit young men, the average age appeared to be approximately mid to late 20s.

The crew changing arrangement ensured that two crews were dedicated to each vessel. The crews therefore had a sense of 'ownership' for their vessel, which generally remained on-station for in excess of one year. Because of this a great deal of routine maintenance work is carried out by the crews, both keeping them busy and instilling a sense of pride in their vessel.

The crews were clearly highly motivated and professional in their approach to the job of providing an effective rescue service. This attitude had obviously been reinforced by the demonstration of their capabilities during the adverse weather conditions of the WEST GAMMA incident. The confidence of the various crews in their rescue abilities was obvious throughout the ESVAGT fleet.

5.3 CREWING LEVELS

The eight converted trawler SBVs had a crew of 6 and the converted supply vessel SBV had a crew of 9. ESVAGT felt these levels enabled them just to cope with the WEST GAMMA incident. They considered they would not have had sufficient personnel if there had been a number of stretcher cases involved. Their only option in this case would have been to motivate and enlist the assistance of other survivors to provide care and assistance to others. Clearly the trauma of an offshore incident and subsequent rescue will affect different individuals in a variety of ways. However, there will remain some uncertainty as to whether enough assistance will always be available from the body of survivors in certain accident scenarios.

5.4 RECUPERATION OF SBV CREW

When the crew of the SBV take part in an offshore rescue they are themselves subjected to considerable stress. The level of responsibility placed upon them is high; the physical effort they are called upon to exert can also be extremely high and may have to be sustained for considerable periods. Where a successful rescue has been achieved, physical exhaustion will dominate. If a significant number of offshore personnel have not been rescued, the SBV crew will most probably also suffer some psychological disturbance. These factors should be taken into account by both charterers and vessel owners in deciding when the SBV crew should return to duty.

In the case of the WEST GAMMA rescue, the SBV crews were on standby for some 10 hours prior to the evacuation at 03.00 hours. The recovery of survivors took some 5 hours and the vessels did not reach Esbjerg Harbour for a further 10 hours. ESVAGT could see that their SBV crews were in no condition to return immediately to their rescue duties. They rested their crews for 12 hours before the vessels returned to sea. Subsequently

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ESVAGT have decided that the SBV will be returned to duties with a relief crew. The rescue crew are to be accommodated in a hotel together with their families and psychological counselling will be provided where necessary.

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6. FAST RESCUE CRAFT

The ESVAGT FRCs were rigid inflatable boats (RIB) with twin out-board engines. The petrol engines were being changed out for Yanmar diesel out-boards which overcome the difficulties of storing petrol on-board the SBV.

6.1 LAUNCH AND RECOVERY

Fundamental to the exemplary performance of the ESVAGT vessels during the WEST GAMMA rescue is their method for launch and especially recovery of the FRC.

Conventional launch and recovery systems often have a system of 4 flexible strops fitted to the floor of the FRC, the end of each strop is then fitted to a common ring which the FRC crewman lifts and connects to a crane hook lowered from the SBV. This is a relatively straight-forward manoeuvre in calm waters and once the ring is engaged in the hook the FRC is raised to the SBV deck level. In moderate to rough sea conditions the technique becomes progressively less effective, the crewman has difficulty in maintaining his balance while holding up the strops and ring in the lively FRC. He also has to take care of his own safety while the crane hook not only swings sideways but also surges vertically due to the relative motions of the FRC and the much larger SBV. During all this activity the crewman is expected to connect the ring onto the hook to enable the FRC to be recovered.

ESVAGT have clearly recognised the limitations of the strop system and have developed a recovery method that they are confident will work in severe operating conditions.

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The essence of the ESVAGT FRC recovery system is to have the FRC lifting point at the top of a fixed post located at the centre of gravity of the craft. With the aid of a quick connect crane hook and tag-line, the FRC crewman is not involved in lifting any equipment and can retain a grip on a hand-hold to maintain his balance. The FRC cox brings his craft under the crane hook, the crewman grasps the tagline and draws the quick connect onto the fastening at the top of the FRC lifting post. Once the connection has been made the crane operator quickly brings the FRC up to the SBV deck level and the FRC is bowsed in hard against the SBV hull, establishing stability and allowing the FRC occupants to transfer onto the SBV.

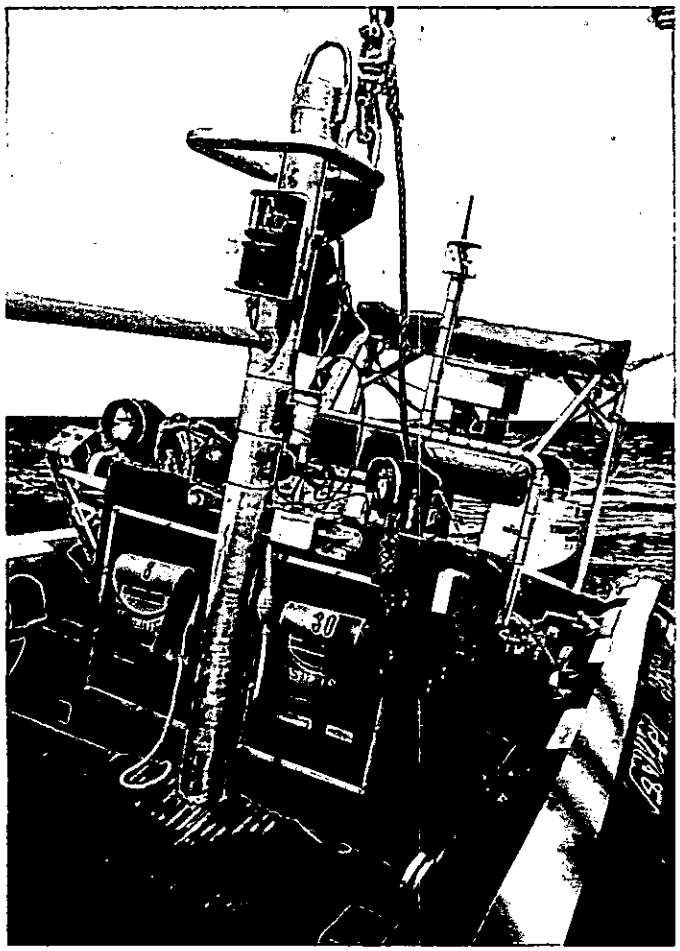

FIG 8 FRC LIFTING POST

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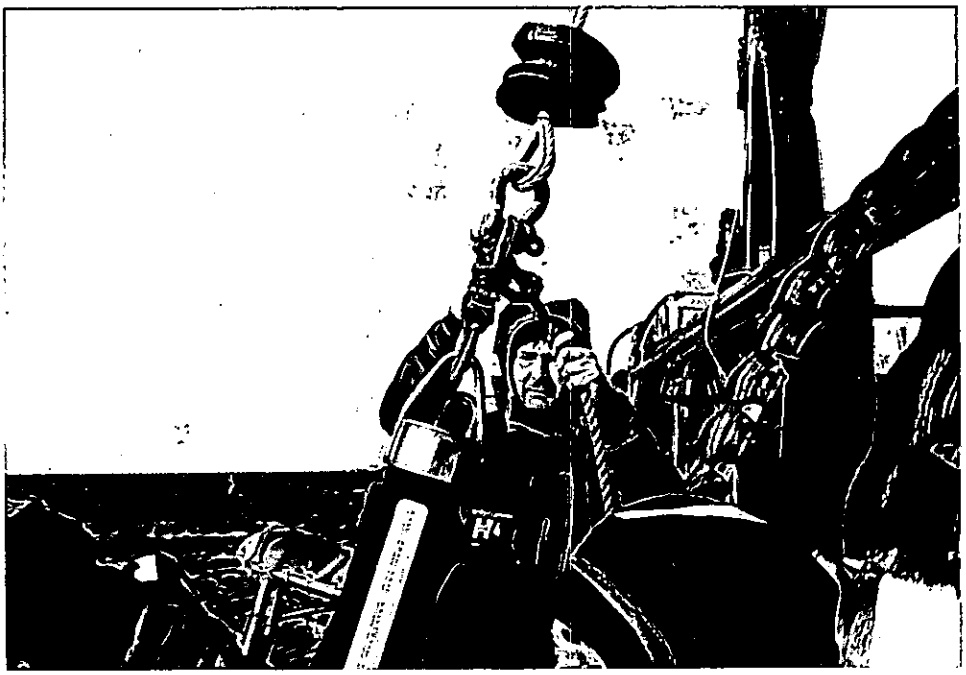

FIG 9 FRC CREWMAN CONNECTING LIFT WIRE

A vital part of the recovery system is the 18 tonne knuckle crane with a high speed lift capability. The articulated lifting jib ensures that the minimum of lift wire is deployed above the crane hook, thus minimising the swing amplitude. The low freeboard and fast lift capability ensure that once the crane is connected the FRC is quickly lifted and stabilised.

The design of the FRC lifting hook has been given considerable thought so that it can be reliably and safely connected and released one-handed by the FRC crewman.

The FRC recovery procedure adopted by ESVAGT is to have the SBV steam downwind with the wind on the port quarter with some 2 to 3 degrees of starboard rudder. This creates a lee on the starboard side for the FRC and the following seas tend to reduce the violent motion between the two vessels.

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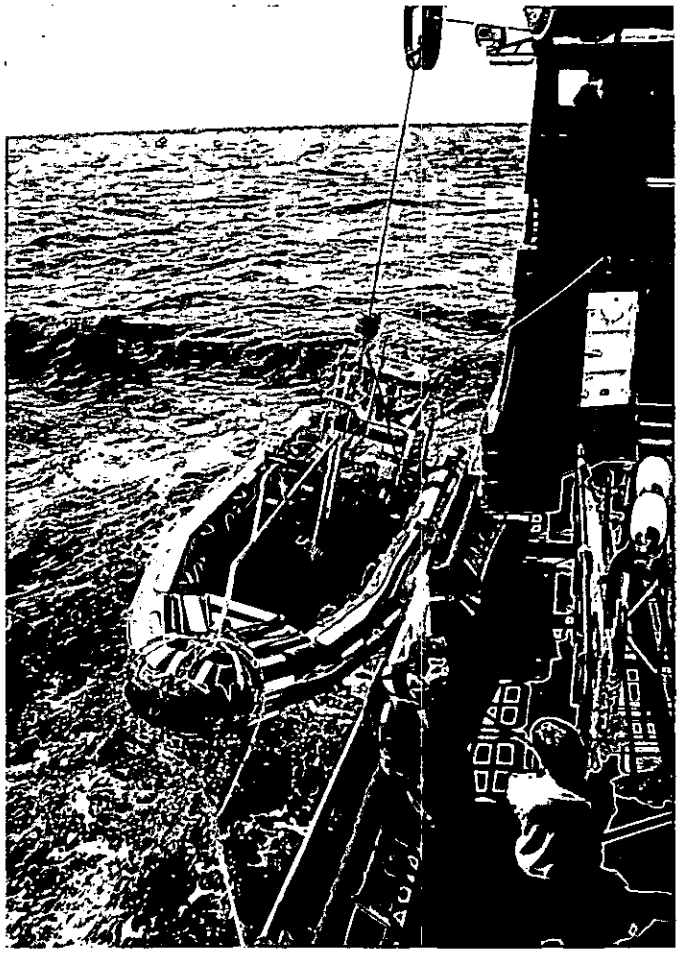

FIG 10 FRC BOWSED AGAINST GUNWHALE

With the constant practise the ESVAGT personnel gain with this system in a wide range of weather conditions, it is not entirely surprising they were so effective in the prevailing conditions of the WEST GAMMA rescue. Those conditions were shown to exceed the limitations of conventional FRC recovery systems.

In the heavy seas during the WEST GAMMA rescue, ESVAGT launched and recovered their FRC from SBV OMEGA seven times. More than once the FRC was swamped by a large wave while it was alongside the SBV. On one occasion the 9 man FRC had 11 persons on board and had shipped well in excess of 1 ton of water, the crane successfully

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lifted the craft but laboured during the lift. ESVAGT subsequently increased the power of their knuckle crane from 18 tonne/metre to 36 tonne/metre and increased the strength of the FRC lifting components.

In heavy weather there are clearly increased dynamic loads. There is a greater chance of overloading, both due to the urgency of the situation where numerous people require immediate recovery and due to excess water on board. The strength of components and the lifting power requirements clearly have to be designed for extreme conditions.

6.2 FRC CREW

There are two crew for each FRC, they sit side by side facing forwards at either side of the console. When recovering the FRC the helmsman concentrates on holding the craft under the recovery crane hook. The crewman stands and catches the tagline on the crane hook and connects the hook to the FRC lifting post eye. With this well practised manoeuvre there is no need for the crewman to move from his initial position alongside the helmsman other than to stand up.

6.3 COMMUNICATIONS

ESVAGT have decided to dispense with any form of communication hand or head set requirements for the FRC crew. In recognition of the need for the crew to be able to move about their craft quickly, without hindrance and to have both hands free, ESVAGT have installed a loudspeaker horn and waterproofed microphone into the FRC console. This system has proved to be very effective.

6.4 SEARCHLIGHTS

The WEST GAMMA rescue took place in total darkness, thus many forms of artificial lighting were in evidence. Helicopters provided dazzle-free high level illumination of the survivors in the water. SBV searchlights were also used to illuminate the survivors, though as these were nearer the surface, the FRC crew found these could, at times, be troublesome. A primary problem with a capsize or sinking is the amount of flotsam on the sea. The ESVAGT FRC are equipped with spotlights which were found to be invaluable when manoeuvring through the floating debris. If the survivors were not tied in groups these searchlights would clearly have also been vital for locating individual survivors.

6.5 AIR INTAKES

The air intakes for the outboard motors are connected to a collector box located under the self righting gas bag. The collector box is fitted with shut-off flap-valves which close should the FRC capsize.

6.6 HULL SHAPE

ESVAGT made a point of explaining that the forefoot of the FRC hull moulding is of a shallower than normal section. They explained that a more conventional deep 'V' configuration had caused problems in steep following seas. ESVAGT were of the opinion that the inevitable slamming of the flatter section was preferable to yawing and the risk of broaching-to in following seas.

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6.7 STABILISING RAIL

The FRC are fitted with a removable rail running fore and aft so as to provide the survivors with a hand-hold and support while at sea and during transfer. Also to aid personnel stability while in the FRC, the deck is covered with non-skid rubberised matting.

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7. SURVIVAL SUITS

The SBV and FRC crews were equipped with thermally insulated, inherently buoyant survival suits. The suits were sized for the wearer, they had integral hard-soled waterproof boots, face and wrist seals together with detachable gloves. The crew's confidence in these suits was demonstrated when a man-overboard exercise was conducted, not using a manikin but with an ESVAGT man in his survival suit. The 'survivor' was quickly recovered, both smiling and with his everyday clothing remaining dry.

In some past incidents, considerable problems have been experienced with inherently buoyant, insulated suits. These have been primarily associated with a loss of mobility while gaining access to the sea or to TEMPSC. The loss of mobility was due to:

(i) inappropriate size of suit - especially if this is too large. The stretching material exacerbates the manoeuvrability problems;

(ii) lack of suitable footwear, often suits were produced with 'bag' feet to fit over conventional footwear or 'membrane' socks which are difficult to fit into boots, shoes etc;

(iii) integral gloves, these provided a good seal from water ingress, but caused consternation due to the lack of dexterity.

The types of suit employed by ESVAGT had overcome many of the above problems and provided an excellent life-preserving capability when immersed. However these suits would have to be worn in combination with a life-jacket if a self righting capability is required and no spray guards were available on the suits.

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8. RECOVERY & AFTERCARE

8.1 RECOVERY

During the WEST GAMMA incident a floating life-jacket fouled the propeller of an FRC, temporarily putting one engine out of service. It is most likely that this life-jacket was swept overboard from the SBV after having been discarded by a survivor. In consequence of this incident ESVAGT have built bins into the vessel recovery and reception areas for both life-jackets and immersion suits to be safely deposited as they are removed by the survivors.

8.2 SURVIVOR MANAGEMENT

It is clear from the WEST GAMMA experience that some of the survivors were in a state of shock for a matter of hours after their rescue. A lesson learnt from this incident has been to quickly escort the survivors to their designated area before providing them with dry clothing, hot beverages etc. This recommendation came about because the survivors in shock were unresponsive to the needs of others and were mentally withdrawn within themselves. They tended to lie down near companionways etc and interfere with the effective running of the vessel.

Most offshore workers are not mariners, after a life-threatening ordeal they will be reluctant to descend into a holding area situated low in the vessel near the water-line. To partly overcome this natural tendency to gain access to the upper levels of the SBV the atmosphere in the survivor's area should be made as hospitable as possible. Surfaces should be easy to clean and air changes should be rapid to control the inevitable build-up of odours when the area is occupied. There is a need for constantly up-dating the survivors on the progress of the rescue, also reassurance is continually required regarding the recovery of comrades and availability of information to families ashore. Effective

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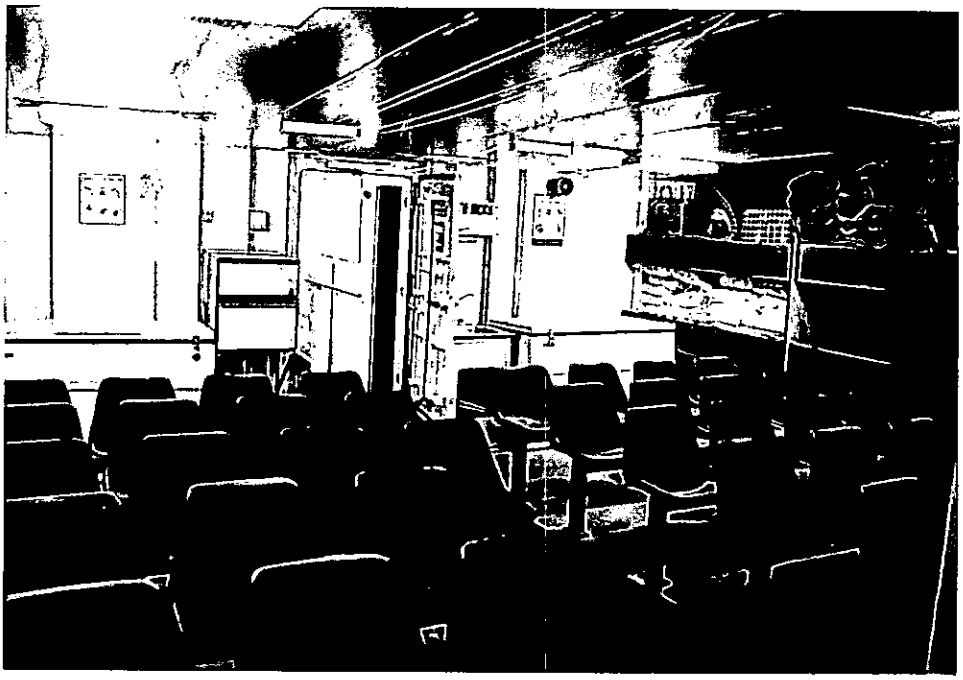

FIG 11 SURVIVOR ACCOMMODATION

roll-calls are necessary, however frequent repeat roll-calls have been shown to be a source of irritation and concern to already distressed offshore survivors.

The ESVAGT vessels had generally taken account of most of the above requirements. The survivor areas were deep in the vessel but were bright and warm with easily cleaned surfaces, though they had a somewhat stark and clinical atmosphere. A significant amount of bunk space had been provided, a further item was the provision of dry towels, 'woolly bear' suits and footwear for all survivors after they had showered. Wet clothing was put into the ship's tumble driers and returned to the survivors.

8.3 RE-WARMING

Survivors who have been immersed in the sea need particular care after recovery to the rescue vessel. The phenomenon of post-immersion collapse is well documented and relates to survivors who have been immersed for extended periods. It is thought that this potentially fatal phenomenon is due to the loss of arterial blood pressure and these survivors must be kept horizontal and relaxed when being transferred to the care area in the rescue vessel.

North Sea offshore rescue times should be within 2 hours for most accident scenarios and it is unlikely that survivors clad in an effective immersion suit will be chilled to a level where post-immersion collapse is of primary concern. However, survivors not dressed in effective immersion suits can easily be severely chilled within the probable rescue time during the winter and handling facilities for these people during a rescue are essential.

Most SBVs have steep companionways where it would be difficult to satisfactorily carry a survivor to a recovery point in anything other than calm conditions.

ESVAGT have addressed some of the usual shortcomings by locating their treatment room near the entrance to the superstructure and providing a significant amount of bunk space in the survivor area. Nevertheless, transfer from the rescue zone to the treatment area generally follows a tortuous route when their vessels are secured for heavy weather. The re-warming bath in the treatment room is well situated; but only one survivor can be re-warmed at a time. Hot showers are available both adjacent to the treatment room and on the lower deck near the survival area. Showers, however, have been shown to be ineffective for safely re-warming hypothermic survivors.

FIG 12 TREATMENT ROOM

There are clearly limitations in what can be achieved in terms of re-warming severely chilled survivors in a vessel at sea. However, some further thought could be given to transferring incapacitated survivors to an effective treatment facility in heavy weather. It is unlikely that a multiple re-warming facility using waterbaths can be provided on a SBV. Some thought should be given to alternative techniques, eg the use of hot water or electrically heated suits and survival bags similar to those used in the diving industry.

8.4 RESPONSIBILITIES PLACED UPON SURVIVORS

Some consideration should be given to the expected performance from a survivor who has been through a stressful experience, both aboard their offshore installation and during an immersion in turbulent, cold seas with a subsequent rescue. Most people, when subjected to such an ordeal, will not respond rationally and their judgement will most probably be impaired. This is no less the case with respect to installation managers, eg the OIM or bargemaster, who could well be suffering additional psychological stress at losing their vessel and possibly some personnel. Any tendency to give these people responsibilities following a rescue should be resisted. If anything these survivors may require more reassurance and care than some others.

8.5 ONSHORE COMMAND

Training is required for the onshore personnel who are involved in organising rescue and reception services. ESVAGT SBV crews experienced some unnecessary stress due to requests from the beach to transfer all survivors to one vessel and then bring them ashore. In the conditions prevailing during the WEST GAMMA rescue this was clearly out of the question and all four SBVs returned to Esbjerg with their survivors. In retrospect such a request was quite unreasonable and is an example of the many ways that unaware onshore personnel can cause unnecessary problems for the already stressed rescue crews.

8.6 RECEPTION ASHORE

The WEST GAMMA survivors had some 12 hours aboard their rescue vessels in which to adjust to their circumstances. Those who were clearly in a state of shock generally recovered after four hours or so. The arrival at Esbjerg harbour, however, caused a relapse in many of the survivors and put considerable stress on the rescue vessel crews.

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The noisy presence of the emergency services with bright flashing lights, press and TV personnel with an insistent manner seeking details of their ordeal and police requiring evidence all present an unacceptable level of stress to people who wish to be in peaceful surroundings with their families.

A great deal of unnecessary stress can be prevented with thoughtful pre-planning by the shore-based staff. The media can be addressed by designated company personnel and an atmosphere of calm reassurance can be generated if reliable information can readily be given to the survivors regarding their families' understanding of their well-being. Particular care in pre-planning is required for the eventuality where rescue vessels may be released by one operator to go to the aid of another. In such circumstances the Press and Information Officers of the two companies must implement agreed procedures before the survivors reach the beach if confusion and errors are to be minimised.

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9. CONCLUSIONS

ESVAGT have demonstrated a commitment to providing a high standard of offshore rescue capability. This has been tested in severe conditions and has been shown to be particularly effective.

Most of the ESVAGT fleet consists of converted trawlers of less than 35m LOA. These vessels are 'sea kindly' in nature and tend to have a reduced motion differential with the fast rescue craft when compared to larger vessels.

The level of investment in the conversion and equipment of the ESVAGT vessels appears to be much higher than has generally been the case with converted trawlers in the UK sector.

The levels of crew training and morale are very high. The average crew age appears to be lower than that often observed in UK stand-by vessels. The policy of leaving the vessels on station for extended periods, with all that this entails, tends to engender a sense of pride in the crew for their vessel and its capabilities.

The ESVAGT methods for launch and recovery of the fast rescue craft are worthy of imitation.

The design of the insulated survival suits used by ESVAGT shows a considerable improvement over suits carried by many mobile drilling units. Thermal insulation has been retained without a great sacrifice of mobility and dexterity for the wearer.

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ESVAGT have given considerable thought to the aftercare of survivors. Dry clothing, replacement footware etc are available for the full designated number of survivors. As with most SBV, handling and rewarming deeply chilled survivors remains an area of weakness.

The lessons learnt by ESVAG regarding the care of survivors suffering post-traumatic shock, both onboard the SBV and at the quayside, are noteworthy. This information extends to the requirements of the SBV rescue crew.

10. ACKNOWLEDGEMENT

The members of the Emergency Evacuation of Offshore Installations Steering Committee wish to express their gratitude for the frank and open co-operation they received from Capt. Ole Andersen and all ESVAGT personnel, thus making this visit both possible and so informative.

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