Seafish Technology SR587

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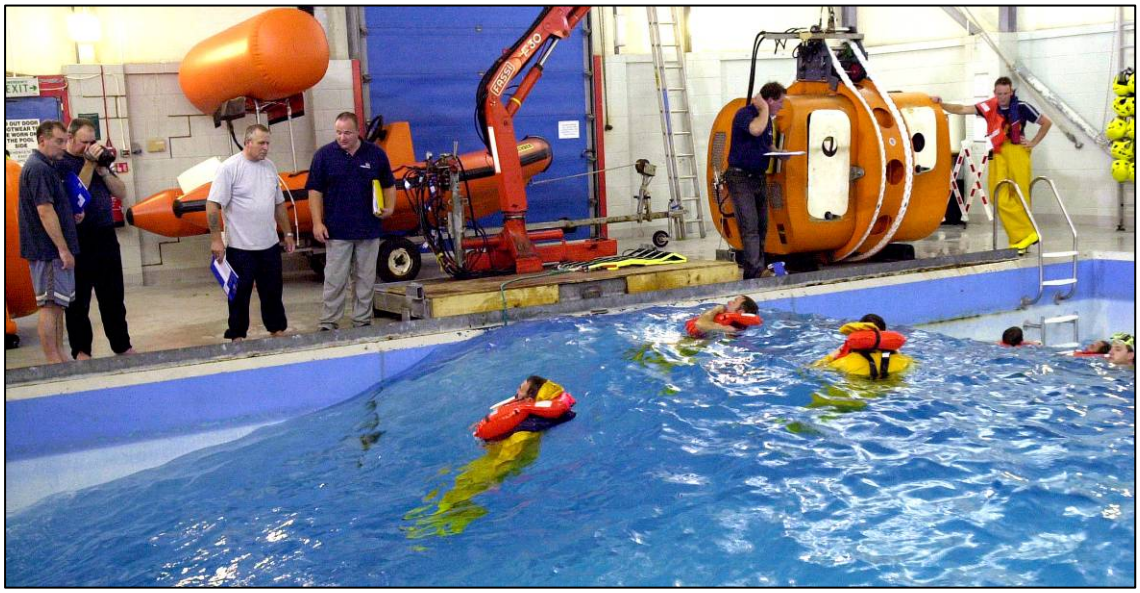
Note: This report is issued by Seafish to officially complete the FIFG funded work. RNLI will be continuing to complete further reviews of the comments from fishermen and after full analysis of the data RNLI will be releasing more information.

Lifejacket and Buoyancy Aid Acceptability Trials
A co-project between Seafish and the RNLI

Summary:

The following report describes the background and the acceptability trials that have been jointly conducted by Seafish and the RNLI, working with commercial fishermen. The trials were in two stages, a test tank assessment to ensure that the products are effective when worn with 'sea gear' plus long term assessments by fishermen in the course of their work. FIFG funding has been granted both by DEFRA and SEERAD, each providing fifty percent of the allowable grant.



The results of the tank test work indicates that the products did perform as expected but problems were experienced with inflated lifejackets being extremely tight around the neck of the wearer and belts being too loose to hold the lifejacket

securely in place. Products appeared to perform better on normal sized persons and did not fit well on persons of a ‘big build’. With one product, the lifejacket cover did not release correctly and the bladder could not inflate fully. Indeed, in one such instance the bladder burst. Concern was also raised when one side of an inflated lifejacket rode over the wearer’s head. Buoyancy aids of less than 100N appeared to give reasonable support in ‘still water’ conditions but in wave conditions they were observed to be inadequate. Splashing to the face occurred with many of the lifejackets in waves.

Fishermen on all types of vessel have been asked to select a buoyancy device from a wide range of available products and to wear this in their normal course of fishing. From their experiences it has been possible to summarise the performance of the buoyancy devices selected and to comment on the features desirable in a buoyancy device suitable for use in fishing.

Table of Contents:

Appendices

Lifejacket and Buoyancy Aid Acceptability Trials, a co-project between Seafish and RNLI

1. Introduction

This is a final report on the acceptability trials conducted by RNLI and Seafish, working with commercial fishermen. The trials were in two stages, test tank assessment to ensure that products are effective when worn with 'sea gear' and long term assessments by fishermen in the course of fishing. FIFG funding has been granted by both DEFRA and SEERAD, each providing 50% of the allowable grant.

2. Background

This project was first put forward in a Seafish proposal in June 2002 as a wide scale programme of trials, with ten groups of fishermen all around the UK in order to promote the wearing of lifejackets as widely as possible. Each group would consist of ten fishermen who would work together to carry out both short term and long term assessments of the available products. A manager would co-ordinate each group and the fishermen would receive modest payment for regular reports. The overall cost was estimated at £250,000 and the intention was to make use of FIFG funding to benefit all fishermen.

Discussions with DEFRA, SEERAD and WEFO resulted in a positive response to the project but, Seafish 'overheads' were not deemed acceptable under the FIFG funding scheme. This increased the shortfall in the available funding from £55,700 to £87,882 and to resolve the problem Seafish approached the Royal National Lifeboat Institution for help. Ian Benham, Water Safety Manager for RNLI took a very positive view and agreed to consider the whole project further in the light of the safety work for the fishing industry that RNLI were involved with. Discussions took place and it was considered sensible to discuss the extent of the trials with fishermen and to gain their views on; the products to be assessed, the number of groups, the duration of assessment and whether incentive payments for regular reports were appropriate.

To facilitate discussions with fishermen, the Fishing Exhibition in Glasgow, 2003 was chosen and selected fishermen and others involved in fishing safety were invited to a meeting. The outcome of the meeting was inconclusive and it was not possible to reach a clear direction for a programme of trials. The comments and viewpoints expressed were valuable and unquestionably, all were agreed that there is a need to improve the awareness of fishermen about lifejackets and buoyancy devices and to identify products that can be recommended to fishermen. It was left that RNLI and Seafish would together consider the various options, the budget available and draw up a project that was cost effective but still included a wide range of products. Full notes of the Glasgow meeting are given in appendix II.

A discussion proposal (dated 16 4 03) was drawn up proposing just five local safety groups which would substantially reduce costs to £85,000. However, RNLI and Seafish, with advice from key individuals in fishing, considered that managing the separate groups may be a problem and cause delay. It was concluded that it was important that work should proceed and by using the two recently employed RNLI Fishing Safety Co-ordinators, David Smith in Scotland and Simon Armstrong in the Southwest, an effective project could be achieved. Advantage was taken of the 'Workboat Show' in July '03 to research available lifejackets and buoyancy devices and Ian Benham of RNLI set out the overall terms of the project as below.

3. Overall Terms of Lifejacket/Buoyancy Aid Project

3.1 Aim/Purpose

To assess if the current range of constant wear lifejackets and buoyancy aids effectively meet the working needs of the fishing industry and to recommend functional design criteria.

3.2. Methodology

1. Purchase a full range of lifejackets and buoyancy aids.
2. Tank test this equipment in order to:-
    a. Identify how they perform in realistic but controlled conditions (i.e. when worn with clothing and oilskins, in waves etc).
    b. To obtain practical feedback from a small number of working fishermen on the relative strengths and weaknesses of the lifejackets and buoyancy aids.
    c. To assess which of the equipment considered could be considered for further evaluation (i.e. produce a shortlist).
3. To evaluate the 'short-listed' equipment onboard fishing boats, using relationships established with fishermen by RNLI Fishing Safety Co-ordinators.
4. To research the views of other fishermen not directly involved in the project using market research, primarily telephone based through RNLI's fishing safety free phone number.
5. In the event of one or more lifejacket or buoyancy aid being identified that effectively meets the need(s) of the fishing industry, to promote these products to the industry.
6. If no equipment is identified as meeting the needs of the fishing industry:-
    a. To produce an operational/functional requirement for market development.
    b. To assess and recommend how to develop future equipment most effectively.

From this overall brief, Seafish drafted a Project Proposal to identify the costs involved to be able to make application for FIFG grant funding towards those costs. See Project Proposal dated September 2003 in appendix III.

4. FIFG Grant Application

Because the project would be taking place in England and Scotland it was necessary to make application to both DEFRA and SEERAD who had agreed to each provide half of the allowable grant of 50% of the eligible costs and applications were made to both bodies in early October 2003. Competitive quotations were required for the various products and this proved to be a difficulty as suppliers generally act as stockists for just one or two manufacturers. Eventually it was found to be easier and more cost effective to deal directly with the manufacturers, most of whom quoted wholesale prices to us. However, acquiring specific quoted prices for each individual item did take time and it was December 2003 before a list of quoted product costs was submitted. Approval was received from DEFRA to proceed with the project on 12 January 2004 but approval from SEERAD was not due for consideration until June. This was brought forward to enable the 'cross border' project to proceed and approval was given in early March. Both applications had been for £25,400 of eligible costs but DEFRA excluded the miscellaneous costs and a contingency for additional group trials as being ineligible. This reduced the DEFRA eligible costs to £21,317.

Further application was made to DEFRA in March for an extension to the grant to cover the costs of persons attending tank test trials in England. This was agreed and a further £4000 was added to the list of eligible costs. This was specifically under the heading of 'Trainers attending tank tests' and may no longer be admissible, as the majority of persons attending the tank trials were fishermen.

5. Purchase of Products

With approval given for the grant, orders could then be placed and two full sets of the various products were assembled by early April. This included 150N and 275N inflatable lifejackets, both single and twin chamber; buoyancy devices, such as work vests and waistcoats; buoyant thermal suits and oilskin clothing incorporating inflatable lifejackets.

6. Test Tank Trials

6.1 Tank Selection

It was considered important to have 'wave facility' available for the trials and two test tanks were known to have these facilities; Lowestoft Centre for Maritime and Offshore Technology and Fleetwood Offshore Survival Centre. A major factor in choosing between the two facilities was ease of travel for the fishermen who would be taking part in the trials. On this basis, Fleetwood was preferred as it is roughly in the middle of the UK and has good motorway links. Contact was made with Fleetwood Offshore Survival Centre and a price negotiated to hire the facility for an afternoon and the following morning at a cost of £950 +VAT. The earliest dates that fitted in with the work programmes of RNLI and Seafish were in late July.

6.2 Participants

There was some discussion about who should participate in the trials work. Seafish proposed using the trainers that deliver the Sea Survival training courses. They have a good knowledge about lifejackets and would be able to communicate their observations about the full range of products to fishermen. RNLI were strongly in favour of using fishermen, pointing out that this was a trial on how acceptable the products are to fishermen. Difficulty is often experienced with getting fishermen to attend distant events but, the two RNLI Fishing Safety Co-ordinators have good contacts with fishermen in their areas and each would bring four fishermen with them to the trials. Four further fishermen were invited by Seafish but, only one was able to commit himself. However, Alan Piggott, Safety Officer for NFFO and an ex skipper, agreed to participate and two of the trainers who were keen to attend were invited to help with the recording of observations.

As set out in the project proposal, it was agreed that the expenses of fishermen and trainers attending trials and meetings would be paid and accordingly, the hotel, travel costs and a nominal sum of £100 was given to each for the time that they were giving.

Also invited was Kimberley Gibson, a student who had designed and made for a project prototype oilskin trousers with a lifejacket. This is a very promising development and hence, she was invited to bring it along for testing.

7. Conduct of trials

7.1 Dress

To properly assess the products, all the fishermen doing the 'in water' testing wore the products over oilskins with jeans, jumpers and Wellington boots, as they would when fishing. Guy Cotton oilskin trousers, tops and boots had been purchased for the fishermen to wear, as only clean gear can be permitted in the test tank.

7.2 Recording Observations

Questionnaire: RNLI Market Research Manager, Janette Dessier had drawn up a questionnaire to be used to record the comments of the fishermen regarding each product. The questionnaire was designed to seek their views on how easy the item was to put on, how comfortable it was, how restricting it would be when working, how well did it activate in the water, was it comfortable, did it feel secure and was it effective in all conditions? The last two questions were; would they consider wearing the product in their normal day to day fishing and when informed of the price of the product, would they consider buying it? A sample of the questionnaire is given in the appendix.

Video: A professional film crew, 'Classlane Limited' was contracted to video the trials. This was not to be an edited film of the event but simply a record of 'what happened' for reference in the future.

7.3 Safety

Prior to the trials, a risk assessment had to be submitted to the Fleetwood Offshore Survival Centre for approval. A key requirement was that a safety diver, a member of the Centre team, would be in the water at all times when the fishermen were taking part in the trials.

7.4 The Trials

These took place over a two day period commencing on the afternoon of Thursday 22nd July 2003 at 2pm until 6pm and then continued the following day, 9:30 to 12:00. This enabled people to travel to Fleetwood during the Thursday morning and return home on the Friday afternoon. Importantly, it allowed the fishermen a break in the testing as it is quite arduous and the water may be cold.

7.5 Procedure

A procedure for the trials had been drawn up previously, as given in the appendix. The procedure proposed dividing the testers into three teams, two fishermen from each team wearing the two samples of a particular product whilst all persons from all the teams observed and recorded comments on the questionnaires. The assessment would be in 'still water' conditions, the first two testers coming out of the water to let the two testers from the second team and eventually, the third team try out their products. After this, all six testers would enter the water and the waves be activated to enable all to observe how well the two samples of the three particular products coped with wave conditions.

This proved to be quite time consuming and as time was also taken to interview the fishermen on video to get their 'first hand' comments, the procedure was quickly abandoned. The new approach was to have four observers, the two RNLI Safety Co-ordinators and the two Trainers, each working with two or three fishermen to note down the fishermen's comments on the products that they were testing. Again, the products were assessed two of each product at a time, video footage taken of each product entering the water and its inflation. When six testers had entered the water, the waves would be activated to observe the performance of the products over a period of around five minutes as the waves built up. In the meantime, the remaining fishermen would be putting on the next products ready for assessment.

8. Results

8.1 Overall Observations

Most products performed as expected, inflating efficiently and giving reasonable support to the wearer in still water conditions. Some of the inflatable lifejackets were found to be uncomfortable when inflated and with most products it was easy for the belts to become slack which allows the product to float up from the wearer. In wave conditions, almost all of the buoyancy aids allowed the wearer to 'dip under' and many of the lifejackets suffered from water flushing into the face of the wearer. Buoyant thermal suits were found to work well in both 'still water' and wave conditions. However, as the wearer is floated horizontally, should he become unconscious, he is liable to float 'face down' just as easily as 'face up'. Wearing a 275N lifejacket with these suits proved effective.

Some products failed. Four samples of a particular model of 150N automatic lifejacket were tried and three of them failed to inflate correctly. The problem experienced was that the Velcro secured cover failed to release on one side, resulting in the bladder being fully inflated at one side and only partially at the other. One of these lifejackets actually burst as the pressure on the one side was too excessive. A failure was also experienced with a twin chamber SOLAS approved lifejacket when the excess gas venting did not function correctly and one chamber burst. Being a twin chamber lifejacket, it did of course continue to support the wearer.

Failures also occurred for reasons other than inflation problems. One lifejacket rode over the wearer's head as it inflated because the belt had failed to hold it down.

The size of individual fishermen is a factor. Products performed well on averaged size persons but on big men problems occurred such as being extremely tight around the neck or the belt riding around the chest and not the waist.

8.2 Questionnaires

The observations recorded on the questionnaires were of varying quality as the time available was insufficient to note down detailed comments. Basic statements of how well it performed and whether the fishermen liked and would buy it were recorded in every case, as were the concerns expressed. Analysis of the questionnaires has resulted in a list of preferred products but with the exception of a couple of products that failed, the strength of evidence was not sufficient to rule products out.

8.3 Product Information Sheets

From the questionnaires and from study of the video material it has been possible to produce an information sheet for each product. These contain basic information about the product, a photograph of it and its approximate cost. The comments given by the fishermen wearing the item in the test tank are given along with brief observation from the video. These sheets are intended for RNLI and Seafish use only at this stage and will not be published until full consultation has taken place with manufacturers and further assessment work has been achieved.

9. Discussion of Tank Trials

All involved in the tank trials commented that it had been an interesting and valuable experience. The fishermen, most of whom had little experience of lifejackets, were surprised at the problems that were experienced and by the end of the trial they had strong individual preferences for particular products. These preferences varied.

Assembling a whole range of products and allowing fishermen wearing oilskins to try them out in a test tank is perhaps a unique exercise. All of the products have of course, been tested, both by their manufacturer and in independent tests, to ensure that they complied with standards. However, these standards check on angle of flotation, distance of wearer's mouth above the water etc. The experienced tester is wearing swimming trunks to minimise the flotation effect of any clothing and the belts and straps of the product are correctly tight. Giving fishermen, dressed in oilskins and boots, a lifejacket to put on and jump into the water gives a different view of the product's performance possibly, a more realistic view.

Using fishermen to assess the products in the water has perhaps, not given results that can be totally verified. They were instructed that the belts must be tight but, the variety of size and shape of the fishermen resulted in a range of 'fit quality'. The opinions of the fishermen varied and most had no past experience to judge the product against. Only two fishermen had the opportunity to try any one particular product and hence, caution must be exercised in placing great credence on their opinions. However, the testing achieved was realistic. This is how fishermen will wear a product and this is the variety of shape and size of person that must be catered for. Wearing the product when working, is going to result in belts slackening off and when the lifejacket inflates and is so tight around the neck that he feels that he is choking, he will not know to deflate the bladder slightly.

9.1. 150N Lifejackets

There is a wide range of products to choose from and this is the type of buoyancy device that is most likely to be considered by fishermen. The cost is reasonable; it can be worn over all types of clothing and will give good lifesaving capabilities. Important requirements for fishermen are; comfort when working, being unrestricting, durable, reliable, effective and affordable. Most of the lifejackets assessed in the trials would satisfy many of the requirements but it is not clear, at this stage, if any single product could satisfy all. In particular, durability, as fishing poses rigorous conditions for a lifejacket to withstand. The long term trials at sea will assess durability.

All of the 150N single chamber lifejackets were considered to be easy to put on and reasonably comfortable to work in. Fishermen who are of a big build did not find the lifejackets to be quite so comfortable. Most lifejackets were criticised for having potential snag points such as toggles, belt buckles, 'D' ring for a safety harness and the lanyard for manual activation. The toggles (provided to attach the lifejacket to a yachting type top) can easily be cut off and most lifejackets can be purchased without a 'D' ring although, such an attachment point is ideal when trying to recover a person from the water. Belt buckles are an area where improvement is needed because with most products, the movement of the wearer appeared to rapidly loosen the belt. However, the fishermen were more concerned with snag points and ease of use. The 'push lock' type buckles were considered easy to use. All lifejackets have a lanyard for manual activation and this is a major snag point on a fishing vessel. The fishermen would simply tuck this away inside the cover otherwise false activation would be an everyday occurrence.

Most of the lifejackets were found to be comfortable when inflated in the water. However, quite a few were found to be tight around the neck and in a couple of instances the fishermen left the tank as the lifejacket was too uncomfortable. In particular, persons of a big build found the lifejackets very restricting around the neck. It is debatable whether this is a problem or not, as the object is to keep the wearer afloat with the mouth clear of the water, not to be comfortable. Indeed, some lifejackets are designed to fit closely around the neck to prevent them from slipping over the head and hence, they support the wearer. This feature may be essential, as the belt could well be slack allowing the lifejacket to float up above the shoulders. Even so, the experience from the tank trials was that some lifejackets caused a feeling of choking which is likely to cause panic in a real emergency situation. Of course, depressing the valve in the oral inflation tube would reduce the pressure and relieve this, although, training and the ability to remain calm will be needed to achieve it.

9.2 High Buoyancy Products

The conventional wisdom is that 150N of buoyancy is the minimum acceptable for offshore conditions and that ideally, more buoyancy is desirable. The 275N products that were included in the trials did give superior support in the water but the fishermen found them to be uncomfortable and the sheer volume of the inflated bladder blocked vision and so restricted the wearer to the extent that he would have been able to do little to assist in his recovery from the water. From the viewpoint of working when wearing the product, the extra weight and bulk of the bigger bladder and cylinder generally results in a product that is too restrictive. It should be noted that 275N lifejackets are recommended for use with buoyant thermal suits as a high level of buoyancy is necessary to be able to right an unconscious casualty. High buoyancy is also recommended when a person is wearing heavy clothing or has heavy tools attached to him.

9.3 Twin Chamber, SOLAS and MCA Approved Lifejackets

These lifejackets comply with the requirements for abandon ship lifejackets which on most vessels are satisfied by carrying the quite bulky inherently buoyant lifejackets. Single chamber inflatable lifejackets are **not** approved for abandon ship purposes, except on vessels below 12m. To be acceptable on vessels over 12m, inflatable lifejackets must have twin chambers, a light, a whistle and the correct reflective tapes. Various manufacturers produce twin chamber inflatable lifejackets as these can be realistically worn whilst working and also have excellent lifesaving capabilities. Of the three products, assessed in the tank trial, all were considered to be too bulky to work in and two, from the same manufacturer, where found to be excessively tight around the neck when inflated. These two products cost £115 and £145 but the third product that did perform exceptionally well in the water was priced at £251.

9.4 Work Vests/Buoyancy Aids

These 50N aids are quite appealing because they are very easy to put on and could be worn underneath oilskins. The waistcoat type products, with the buoyancy provided by a foam lining, were considered to be unrestricting and hence could be worn whilst working. The industrial buoyancy aid work vests that have thick foam in the chest area were viewed as being too bulky and restrictive. In 'still water' conditions, all of the products were quite adequate, keeping the wearer's mouth clear of the water. However, in wave conditions the mouths of the wearer's were dipping under the water. The exception was a 100N work vest that did keep the wearer's mouth clear of water and similarly a 70N product was seen to be considerably better than the 50N products.

The fishermen did like the two waistcoat/body warmers that were tried. These are virtually conventional garments with a buoyant foam lining and wearing them underneath oilskins would not be a problem, except perhaps, in warm conditions. The 'in water' performance was reasonable and thus, these products appear a good compromise between wear ability and lifesaving capability. However, it is important to appreciate that if the wearer became unconscious, he would float face down!

9.5 Inflatable Work Vest/lifejacket

Mullion Manufacturing Limited has developed a lifejacket that is combined with a work vest giving the advantage of a garment as well as a lifejacket. 150N and 275N versions are available and both performed well in the tank trial. Fishermen considered them comfortable to wear and not too restrictive to work in although, the 275N version was viewed as being a little bulky. 'In water' performance was good and the products were liked by the fishermen but the price at around £150 would deter them from buying the product.

9.6 Hybrid Lifejackets

These are a product that combines the advantages of inflatable buoyancy with the reliability of inherent buoyancy. A 150N inflatable lifejacket is combined with a 50N inherently buoyant waistcoat. Two products from different manufacturers were assessed. Both gave good 'in water' performance but, both were considered to be too bulky to work in.

9.7 Buoyant Thermal Work Suits

These are suits that are designed to float the wearer and also provide thermal protection. Typically, they consist of a heavy duty fabric one piece suit with a lining of closed cell foam to provide buoyancy and the thermal properties. Buoyancy is usually 50-80N and the suits have pockets, a hood and are equipped with Velcro straps to seal the cuffs and ankles to prevent cold water flushing through. They have reflective tape on the shoulders, hood and cuffs. A big advantage of these suits is the thermal protection they provide as 'cold shock' causes an involuntary reaction of gasping for air that incapacitates a person for a brief period. In the tank tests all the suits performed well, the wearer being floated in a horizontal attitude. Swimming was easy and the wearer could manoeuvre freely. In wave conditions, the suits were also good, as there was little tendency to dip under. However, it must be appreciated that if the wearer should become unconscious, he could float 'face down' as easy as 'face up'. High buoyancy, 275N lifejackets are recommended to be worn with these suits in order to have sufficient buoyancy to counteract the buoyancy of the suit and turn the wearer into a 'face up' attitude.

The view of the fishermen was that such a combination would simply be too bulky to work in and the cost would be excessive. Many fishermen did state that they would consider wearing a suit, especially in winter but, they would be too hot for much of the year.

9.8 Oilskins/Lifejackets

These are an attractive product to fishermen as the lifejacket is combined with oilskins that are necessary for the job of fishing. One problem is that oilskins may not be worn all of the time and often, the trousers will be worn without the top. In general, when the fishermen is on deck and exposed to the risk of falling or being dragged into the sea it is usually during ‘shooting’ or ‘hauling’ operations and oilskins will be worn.

Placing the lifejacket in the oilskin top is an obvious approach but, quite often the top may not be worn, just bib and brace oilskin trousers. Placing the lifejacket in the bib section or incorporating the lifejacket as the braces of the trousers are approaches used in two products that were included in the trials. However, if the lifejacket is part of the trousers, problems arise when an oilskin top is worn over it. Space must be available for the lifejacket to inflate and how is the manual activation to be accessed?

Oilskin Top with Lifejacket: One cagoule type oilskin top with a 165N lifejacket, the Viking Elka top, was part of the trial and this was considered to be fairly good by the fishermen. It was unrestricting to wear and performed well in the water although, the large bladder extended downwards and did not support the wearer especially well. A similar product by the same manufacturer was a work suit with an inflatable 165N lifejacket built in to the chest and shoulder area. This was in blue nylon fabric and would be suited for general wearing around the vessel.

Lifejacket in Bib: One oilskin trouser product, the 'Seafish-Crewsaver' by Guy Cotten, has a manually activated lifejacket stored in a pouch formed in the bib section. In use, the pouch is rapidly ripped open, the lifejacket unfolded and slipped over the wearer's head and the lanyard pulled to activate inflation via the gas cylinder. This can all be achieved in a few seconds when in the water. If an oilskin top is being worn, even, the cagoule type that has to be lifted over ones head to take off, the lifejacket can still be in place and inflated in around 20 seconds. It is much easier with the opening jacket type tops. Manual activation is adopted to enable the lifejacket to be stored in the bib section and not constantly around the wearer's neck thus, minimising the interference. Also, the lifejacket cannot unexpectedly inflate underneath an oilskin top which could result in the wearer's breathing being restricted.

This product was found to be comfortable and unrestricting to wear by the fishermen and performed well in the water. However, they preferred an automatic lifejacket that would inflate even if they were unconscious on entering the sea.

Lifejacket as Braces: An oilskin trouser product, the 'Secubib' that was favoured by the fishermen had a 150N automatic inflatable lifejacket as the braces of the bib and brace trousers. As with other halter style lifejackets it is worn around the neck and held down at the waist by a belt which is threaded through loops in the bib and brace trousers. The fabric used for the lifejacket cover is quite soft and the lifejacket is packed in a broad flat section to be comfortable to wear around the neck and shoulders, like wide strap braces. The 'in water' performance was good and because the lifejacket is attached to the oilskin trousers, the tightness of the belt is not so important, as the trousers act as a crutch strap.

Expanding Oilskin Top: A '3D Top' is marketed by Guy Cotten to address the problem of possible restriction to breathing that is likely to occur if a normal oilskin top is worn over an inflatable lifejacket. This expanding top has a folded pleat section at the front of the cagoule type top. A zip with a Velcro flap holds the top to a normal size and should the lifejacket inflate, the zip and Velcro flap are intended to burst open allowing the pleat to unfold thus, expanding the top to give space for the lifejacket bladder to inflate. In the tank trials, with both samples, the zips failed to release as intended by the inflating lifejacket and had to be assisted open by the wearer. Once released, the jacket did accommodate the inflated lifejacket and the wearer was well supported in the water. Indeed, the jacket serves to hold the lifejacket down giving improved flotation.

An effective alternative, demonstrated in the trial, was an opening jacket style oilskin top with press studs to hold it fastened. This was found to easily burst open if worn over an inflatable lifejacket.

9.9 Prototype Oilskin/Lifejacket

A project undertaken by Kimberley Gibson, when a student at Glasgow College of Art and Design was to research safety clothing for commercial fishermen. This resulted in a design for a bib and brace oilskin trouser incorporating an automatic inflatable lifejacket. At stages during her project, she had been in contact with Seafish to research fishermen's needs and had impressed Seafish with her design concept. Modest funding was provided by Seafish to help manufacture a prototype and she was invited to the Fleetwood trials to demonstrate the product 'in water'.

The design was viewed favourably because it took a different approach to other products. The lifejacket is stored in a pouch formed in the 'bib section' of the oilskins but, contrary to a similar product that has a manual lifejacket which the wearer must place over his

head and then inflate, this lifejacket extends up out of the pouch to form the braces around the neck of the wearer. The end of the lifejacket has a short adjustable strap with a push lock clip and this strap couples back to the bib section. The bulk of the lifejacket is in the bib pouch which results in a more comfortable product to wear and yet, the lifejacket is in place around the neck of the wearer and thus automatic inflation can be employed.

One fisherman wore the prototype and he and the onlookers were impressed that it was comfortable and unrestricting. On jumping into the water, inflation commenced quickly but the bladder section around the neck was slow to inflate. The lifejacket gave reasonable support despite the bladder not being fully inflated. This was the first time the product had been tried in water and it is likely that a bigger gas cylinder would have given much better performance. It was certainly a very promising first trial.

Kimberley is currently studying at Cambridge University and has not had the time to pursue the commercial development of her design. However, it will not be overlooked in this joint project of acceptability trials as, when all products have been assessed, Kimberley's oilskin design may promise a satisfactory solution for fishermen.

10. Preparation for Sea Trials

10.1 Re-packing of lifejackets

Following the tank tests, around ninety products had to be dried, re-packed and sorted into two sets of samples. Re-arming kits had been purchased with all the inflatable products and most of the non-approved lifejackets, (not approved by MCA for use for abandon ship purposes) can be re-armed and repacked by the individual following the manufacturer's instructions. 'Approved lifejackets' must be re-packed by an approved agent.

Most single chamber lifejackets are reasonably easy to repack and the re-arm kit will cost around £10-15 retail. It is important that the manufacturer's instructions are carefully followed and that the gas cylinder is tightly screwed into the valve because if not really tight, it can work loose with the movement of the lifejacket when it is being worn. Hydrostatically activated inflatable products are recommended to be re-packed by the manufacturer or, an approved service centre, as it is important that the bladder is totally evacuated and the hydrostatic mechanism is quite complex. Typical costs for re-packing will be £20-30 and carriage costs may also be incurred.

10.2 Product information sheets

As is reported in 8.3 of the results, the information gained from the tank test was summarised on information sheets. These are initially required by RNLI and Seafish as a convenient reference when showing fishermen the range of products for selection. Eventually, the information sheets may be issued more widely as a source of information for fishermen but verification of the results must be achieved before publication. Preparation of the product information sheets took quite a long time as it was necessary to study closely the video footage to be able to add to and confirm the information that had been recorded on the questionnaires.

10.3 Video Evidence

Some products did not perform as expected and the manufacturers will wish to be aware and able to comment on the perceived performance. In total there is around four hours of video covering the test tank work and this includes all the products from all manufacturers. To maintain as much confidentiality as reasonably possible, the video material has been edited into sections relating to the different manufacturer's products. Classlane Limited were asked to produce the individual tapes, but even so, considerable time was taken in looking through the video footage to identify which sections were relevant to be able to advise Classlane. The individual tapes will be sent to the respective company along with the relevant product information sheets for their comment. This has not yet been achieved and it is expected that a portion of the work of RNLI and Seafish on this Lifejacket Project in the future will be engaging with manufacturers.

10.4 Sample Sets

Due to the restrictions of other work and the time taken in re-packing products, sending products away for repacking, searching through the video material and preparing the product information sheets, it was mid November before two full sets of samples were available to be shown to fishermen. Each set contained one of all the products tested in the tank trials, each product numbered to reference it to the product information sheets. Exceptions to the sample sets were two products that had raised concern in the tank test. These products will be discussed with their manufacturer and possible re-tested. If then, confidence is gained in the particular products they will be included in further sea trials work.

The samples were sent to David Smith and Simon Armstrong both, RNLI Fishing Safety Co-ordinators for Scotland and the Southwest respectively.

10.5 Fishermen

The Fishing Safety Co-ordinators are to show the range of products to selected fishermen in their areas. In choosing the fishermen, the personal knowledge of the Co-ordinator will be used to contact fishermen who can be relied upon to wear the products, to assess them properly and to report back their findings. Fishermen representing the full range of fishing activities will be contacted and asked to choose a product that they feel will be most suitable for their work. This will be purchased for them to wear in the normal course of fishing, over a period of several months to a year. Contact will be maintained with the fishermen and their comments and the wear damage to the products noted.

Prior to sending the samples to the RNLI Co-ordinators, Seafish showed the products to two particular fishermen who had a keen interest in lifejackets suitable for use in fishing.

Jason Rudd is a small vessel fisherman from Newhaven in Sussex and has been in contact with Seafish for many years about suitable lifejackets and buoyancy devices. Jason had assessed the prototype 'Seafish-Crewsaver' oilskins and had worn the finished product daily for a year or two until he

adopted the Guy Cotten Secubib oilskin trousers. He consistently wears a buoyancy device when fishing either ‘single handed’ or ‘two handed’. He took part prominently in the initial discussions in Glasgow and also, was a participant in the tank test trials. Jason has selected a work suit with an integral inflatable lifejacket to assess in the winter months and a lightweight ‘sport’ lifejacket for the summer.

Dylan Silverwood is the skipper/owner of a potting vessel at Bridlington, Yorkshire and has tried many lifejackets for himself and his three man crew. He has been critical of many products, finding that they simply are not up to the rigors of fishing. These are particularly severe on an intensive potting operation vessel, as the pots abrade against the lifejacket when they are being carried around the vessel for stacking and shooting. Dylan’s experience has been that a lifejacket will be worn through in two or three months. The covers often repeatedly come undone, belts persistently work loose and the gas cylinder may dig into the chest of the wearer when working. He is very safety conscious and insists that his crew wear lifejackets but has found difficulty in finding a lifejacket or buoyancy device that is suitable. Dylan has selected three different lifejackets, a lightweight buoyant thermal suit and a pair of Secubib oilskin trousers with a 3D top for him and his crew to assess.

10.6 Ordering Products

The work of contacting fishermen did not fully commence until the end of February ’05 as RNLI had other priorities that had to be met. However, through personal contacts and through the network of lifeboat crews, lists of products have been compiled for leading vessels in Peterhead and for smaller vessels in Arbroath, Fraserburgh and Mallaig. Similarly, in the Southwest, a list has been drawn up for Brixham fishermen and the many other harbours and indeed, the beaches where fishermen operate are being visited.

The contact with fishermen, showing them the range of products and asking them to select one to evaluate, continued through to June 2005. In most cases, the product was delivered to the fisherman within two to four weeks of making the selection. Products were ordered as late as October 2005 to give fishermen in the Shetlands the opportunity to assess the range of products.

11. Sea Trials

11.1Product Selection

Being presented with a range of over forty products was a surprise to many fishermen as they were not aware of all the different makes of lifejacket and the buoyancy devices that are available. In selecting a product, the fisherman would carryout a process of elimination according to the fishing activity. Many fishermen looked at the buoyant thermal suits but rapidly came to the opinion that for most of the year, such garments would simply be too hot to be able to work in. Ease of wearing was a feature that everyone looked for and in this respect, the buoyancy vests were considered. Two products, the Guy Cotton 'Pecheur Flotation Waistcoat' and the Mullion 'Floater Waistcoat' were popular and seven of each of these was selected by individual fishermen. These products are a waistcoat or a body warmer style garment with a buoyant lining. They are extremely easy to wear, they look like a normal item of clothing and can be worn underneath 'sea gear'. Only limited buoyancy is provided by these products, such that they will not correctly support an unconscious casualty and even though this was pointed out by the RNLI Co-ordinator, many fishermen were keen to try them. The justification put forward by the fishermen being that; it is better to have a modest buoyancy device that will be regularly worn, than a high buoyancy lifejacket that won't be worn.

Many fishermen appreciated the need to have 150N or more of buoyancy to be able to keep an unconscious person in a face upwards attitude and made their selection from the wide range of inflatable single chamber lifejackets. Ease and comfort of wearing, being in-obtrusive and robust were the prime considerations. All fishermen were concerned about snag points and the toggles, that many lifejackets have to attach them to a jacket, were universally condemned. However, as these can simply be cut off, it is not a problem. The bead or toggle on the manual inflation pull was seen as a problem as this would easily snag on fishing gear. The only sensible solution to this is to tuck it inside the lifejacket cover and should the automatic inflation mechanism fail, the cover would have to be opened to access the manual pull.

The most popular lifejackets selected; in each case six fishermen chose to wear one to wear during the trials, were:

- Secumar Alpha Window 150N because it was considered that it would be comfortable and easy to wear;
- Gael Force Hi Line Pro 150N because the short length of the lifejacket would not be in the way when handling fishing gear;
- Ocean Safety Sport 150N because this is a very compact lightweight lifejacket.

By far the most popular of all products were those that combined an inflatable lifejacket with oilskin clothing. The 'Seafish Crewsaver' oilskin trousers contain a manually activated inflatable lifejacket in a pouch on the bib section and the 'Secubib' oilskins trousers incorporate an automatic inflatable

lifejacket as the braces of the trousers. Both of these products are by Guy Cotten. Similar products were included in the test tank work from Viking Life-saving Equipment Limited. These were an oilskin top and a worksuit both incorporating an automatic 165N inflatable lifejacket with a 'Hammer' hydrostatic mechanism. Although, several fishermen did wish to select the Viking products, it was not possible to supply them as they were no longer available.

Of all the products, the Guy Cotten 'Secubib' oilskin trousers with the automatic lifejacket forming the braces, was the one most selected by fishermen. This product was seized upon as being their normal oilskin trousers, which they wear as a matter of course, with a lifejacket unobtrusively added. Many fishermen wished also to have the '3D' oilskin top that compliments the trousers and is designed to expand to accommodate the inflated lifejacket. A total of 26 'Secubib' oilskins were requested by fishermen, 40% of all the products in the trial. The number would have been considerably higher if the decision had not been taken to refuse further requests for these oilskins in order to ensure that other products were evaluated. At the end of March 2005, the remaining money in the budget was used to purchase 'stock' items to be offered to fishermen to try to achieve a wide test of the available products.

11.2 List of Selected Products

Products used in Acceptability Sea Trials	Chosen	Stock	Total
Lifejackets			
ASPLI			
A36 150N	1	6	7
Secumar Window 150N	6		6
Secumar Alpha 150N	1		1
Cosalt			
Crewfit Hammer 150N	2	4	6
Crewfit Standard 150N	1	6	7
Voyager Hammer 150N	1	4	5
Gael Force			
Hi Line Pro 150N	6	4	10
International Safety			
Challenger 150N	2	8	10
Challenger Offshore 150N twin chamber	2		2
Hi Line 150N * not available for selection	*	4	4
Lalizas			
Sigma 150N	2	4	6
Omega 150N	1	6	7
Mullion			
Mariner 275N	1		1
Neptune ECO 150N	1	4	5
Mullion CE 150N	4	4	8
Ocean Safety			
Commodore 150N	2	8	10
Sport 150N	6	4	10
Kestrel 150N		4	4
Lifejacket/Oilskins			
Guy Cotton			
Seafish Crewsaver 150N manual	8	6	14
Secubib 150N auto	26		26

Viking Fisherman's Smock
Note: 6 fishermen did select this oilskin top with lifejacket but the company ceased to market the product.

	Chosen	Stock	Total
Lifejacket/waistcoat			
Mullion			
Seefloat Waistcoat 150N auto	1	6	7
ASPLI			
Regatta 403 Hybrid 50N + 150N	1		1
Buoyant Waistcoat/Work Vest			
Guy Cotton			
Pecheur waistcoat	8		8
Mullion			
Floater Waistcoat	3	4	7
Fladen			
Floatation Smock	2		2
Buoyant Thermal Suits			
ASPLI			
Newton light weight suit	1		1
Mullion			
Aqua Float Supreme	1		1

Viking Worksuit with 165N lifejacket
Note: 4 fishermen did select this worksuit with automatic lifejacket but the company ceased to market the product.

11.3 Conduct of Sea Trials

Having shown the range of products to the fisherman, discussed them and asked the fisherman to make a selection, the RNLI Fishing Safety Co-ordinator would, 2-4 weeks later, deliver the item to the fisherman and take note of his initial impressions. These initial impressions were almost universally positive about the product but a further visit would be made in 2-3 months for the 1st review and a 2nd review at 5-6 months.

Most fishermen, as expected were very conscientious about wearing the product and giving it a fair evaluation. Just one or two fishermen admitted that they had not worn the item much and in such instances, the item would be given to another fisherman to try.

11.4 Evaluation

Questionnaires were used to record the fisherman's comments and a score system, 1-10, was devised to rate the product for:

- Suitability when working the fishing gear;
- Suitability for simply wearing;
- Durability.

General comments were recorded and also included on the questionnaire were 'Minor Irritations/Hazards' and 'Major Irritations/Hazards'.

All products have had the first review and many have also had a second review. The scores from these reviews can be analysed but the comments from fishermen are subjective and sometimes inconsistent. The scores for all the products ranged from:

Suitability when working;	3.6 – 10	typical score 7 - 8
Suitability when wearing;	6.2 – 10	typical score 7 - 8
Durability:	6.5 – 10	typical score 8 – 9

The scores were remarkably consistent for all of the different products and did not clearly identify one product as being demonstrably better than another. The comments by individuals did give observations about individual products, such as:

- Rubs on neck
- Too hot to wear for a long time
- Getting a bit smelly
- Jacket has false inflated
- Never worn one before, never go to sea without it now
- Toggle can snag
- Will use in winter months

- Buckle is difficult to use when cold
- Toggle caught in nets when hauling and went off
- It's a bit flimsy for deck work
- The bottle dug into chest
- Velcro opens
- Removed crotch strap – snagging on pots
- Nice to know I can wear a lifejacket in bad weather
- Bit bulky in a tight space
- Too hot to wear in warm weather
- Cylinder in the wrong place
- Bottle has worked itself loose on a couple of occasions
- Rubbish! Fell apart in one month
- Too bulky when working
- Material too firm

The above illustrates the range of comments but, the analysis of the questionnaires does not, at the present, record if each comment is attributable to one individual only or, if they are the views of all who tried the product. Hence, whilst it is essential to be aware of these comments, they cannot be used to identify the most suitable, or unsuitable products. Rubbing on the neck was a complaint with almost all the lifejackets as was the toggle snagging on things. The comment often made that it is too hot to wear in warm weather implies that some fishermen will only be wearing their lifejacket in the winter months.

RNLI intend to continue with the acceptability trials and will be contacting fishermen to achieve all the second reviews and subsequently, the third reviews. This additional detail will enable a fuller analysis of the questionnaires and perhaps identify a ranking of products. In the meantime, as the project was to have concluded a year ago, this report considers a wide overview of buoyancy products and attempts to draw sensible indicators for the benefit of both fishermen and manufacturers.

The following section 12 gives summations of the different products that fishermen selected for use at sea. The comments have been compiled from a discussion with David Smith, RNLI Safety Co-ordinator Scotland, who had the greatest contact with fishermen participating in the trial. They are the comments given to him by those fishermen who have tried the products diligently and given sensible assessments. Included in the summations are the views of the fishermen who wore the products in the tank test session at Fleetwood.

12. Product Summations

Product No 1

Mullion 'Neptune ECO 150N auto **approx. price £60-70**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: Halter style lifejacket with red nylon fabric covers and Velcro fastenings. The waist belt has a stainless steel 'loop in loop' buckle and a crutch strap is fitted. The lifejacket has toggles for mounting to a jacket.

View: The reports from fishermen were that this is a lightweight comfortable lifejacket and the 'flat design' results in it being reasonably unobtrusive. Of the three lifejackets in the trial, one had falsely inflated and one fisherman complained that it was difficult to keep clean. Comment was made that the buckle is difficult to operate as it is thin material and difficult to handle. The crutch straps were not worn by any of the fishermen.

Tank test: The lifejacket was liked by fishermen but in water they found that their mouths were going under in wave conditions. Crutch straps should be worn to give correct support.

Conclusion: No major problems experienced; this lifejacket is considered quite comfortable and acceptable for wearing when working but, the performance in waves was disappointing.

Product No 2

Mullion 'Neptune 150 CE auto **approx. price £60-70**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: Halter style lifejacket with navy nylon fabric covers and zip fastening. The belt has a 'loop in loop' stainless steel buckle and a crutch strap is fitted. No toggles are fitted.

View: The reports from fishermen were that as, with the ECO model, this is a lightweight comfortable lifejacket and the 'flat design' results in it being reasonably unobtrusive. The CE model has the zip fastening for the covers which is perhaps preferable to Velcro and the blue colour is preferred by fishermen. Again, comment was made that the buckle is difficult to operate as it is thin material and difficult to handle. Of the two fishermen who tried this lifejacket, one commented that he 'could wear it all day'. The crutch straps were not worn by either of the fishermen

Tank test: The lifejacket was liked by fishermen but in water they found that their mouths were going under in wave conditions. Crutch straps should be worn to give correct support.

Conclusion: No major problems experienced; this lifejacket is considered quite comfortable and acceptable for wearing when working but, the performance in waves was disappointing.

Product No 3

Mullion 'Mariner' 275N auto **approx. price £90-100**

Single chamber lifejacket, 275N that conforms to EN 399

Product description: Halter style lifejacket with red nylon fabric covers with zip fastening. The lower sections of the covers are faced with red PVC. The belt is secured with a 'loop in loop' stainless steel buckle. No toggles.

View: Only one fisherman selected this product or, indeed, any 275N lifejacket, and he chose it because as a big man, 6' 4'' the lifejacket was in proportion to him. Working on a large trawler he has experienced no problems and is pleased with the lifejacket.

Tank Test: Both testers found the lifejacket easy to don and comfortable to wear out of the water. However, in the water they found it uncomfortable to wear when inflated and considered the inflated bladder to be too big. They found that the discomfort was worse in wave conditions.

Conclusion: A high performance lifejacket that is comfortable to wear but, possibly too heavy for most fishermen to wear continuously.

Product 4

Lalizas 'Sigma' 150N auto **approx. price £50**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: Halter style lifejacket with red nylon fabric covers secured with Velcro. The belt has a stainless steel 'loop in loop' buckle and the optional 'D' ring for a safety harness. No crutch strap or toggles.

View: Comments were received from one fisherman and he found the lifejacket to be very lightweight and comfortable to wear. However, the Velcro easily became un-fastened and he did not consider it to be robust enough for use in fishing.

Tank Test: Both testers found the lifejacket comfortable to wear but in the water it 'rode up' due to the lack of a crutch strap.

Conclusion: A comfortable lifejacket at a modest price but perhaps not durable enough for intensive use in fishing

Product No 5

Lalizas 'Omega' 150N auto **approx. price £60**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: Halter style lifejacket with a folded down collar. Red nylon fabric covers with Velcro fastenings. Belt has a stainless steel 'loop in loop' buckle and an optional 'D' ring fitted for attaching a safety harness. No crutch strap and no toggles.

View: Three fishermen tried this product and though it was considered 'nice and light' it was not rated as high as other lifejackets for use when working. Comment was received that it rubbed on the neck and the toggle has a tendency to snag. Concern was expressed about keeping the lifejacket clean and the durability of the lightweight covers.

Tank Test: The lifejackets inflated very efficiently but both testers reported that the lifejacket 'rode up' leaving them feeling insecure.

Conclusion: A lightweight lifejacket but perhaps not robust enough for intensive use in fishing.

Product No 8/9

Viking 'RescuYou Conquest' 150N auto **approx. price £80-85**

Single chamber lifejacket, 150N that conforms to EN 396

Product Description: A halter style lifejacket with a rounded collar. Red nylon fabric covers secured by Velcro fastenings. The lifejacket has a stainless steel 'loop in loop' belt buckle but no crutch strap. Toggles are fitted and the lifejacket has an external lifting or pulling loop on the outside of the cover.

A harness version is available with twin back straps and crutch straps.

View: The three fishermen who assessed this product found it to be lightweight and comfortable and the flat design resulted in it being reasonably unobtrusive. The toggle can snag and one lifejacket falsely inflated. Keeping it clean could be a problem and one fisherman reported, 'getting a bit smelly'.

Tank Test: One of the four samples tested was slow to inflate but all performed well in the water. Two of the testers found it to be very comfortable.

Conclusion: All four fishermen who tried it in the tank test said that they would wear and indeed buy this product. One stated that it was the first lifejacket that he had tried that did not choke him when inflated. The results from the sea trials were also positive and this is viewed as a good effective lifejacket

Product No 10

Crewsaver 'Crewfit' 150N auto Standard **Approx. price £87**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A halter style lifejacket with a fold down collar. The red or navy nylon fabric cover is fastened with Velcro. Toggles are fitted. The belt has a plastic 'push lock' buckle and a crutch strap is supplied with the lifejacket that requires the belt to be unthreaded to fit the crutch strap. The auto head is supplied sealed in a bag and has to be fitted by the user.

View: Six fishermen had chosen this lifejacket and all considered it easy to wear as it is very slim. The toggles for attaching it to a jacket were an obvious snag point and most fishermen cut them off. One fisherman commented, 'never worn one before, never go to sea without it now'. Another complained that it rubbed too much around the neck. One observation was that it is a fairly long lifejacket and in fisheries such as potting, where pots are carried held to the chest, the lower section may easily be damaged.

Tank Test: Both samples inflated properly and rapidly and supported the wearers well in the water. Both testers scored it 5 out of 5 for comfort.

Conclusion: A good effective lifejacket that is easy to wear and performs well in the water.

Product No 11

Crewsaver 'Voyager' 150N auto (hydrostatic) **approx. price £88**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A single chamber halter style lifejacket with a rounded collar. The cover is orange PVC and has zip fastenings. The belt has a plastic 'push lock' buckle and the inflation mechanism is the 'Hammer' hydrostatic.

View: A good flat design with washable covers and zip fastenings which remain secure. Both fishermen who reported on this product considered it comfortable to wear and very durable.

Tank Test: The two samples inflated efficiently and supported the wearer well. The testers stated that it was very comfortable and in calm conditions they had no problems. However, in wave conditions they both reported that a lot of water was flushing between the two sections of the inflated bladder and hitting their mouths.

Conclusion: A good wearable and durable lifejacket suitable for fishing. The tank test gave doubts about its performance in wave conditions. (It should be noted that questions have been raised about the reliability of 'Hammer' hydrostatic mechanisms.)

Product No 13

Crewsaver 'Crewfit' 150N auto hydrostatic **approx. price £103**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A halter style single chamber lifejacket with a fold down collar. The cover is blue nylon fabric fastened with a zip and has toggles fitted. A crutch strap is supplied but needs to be fitted. The inflation mechanism is 'Hammer' hydrostatic.

View: Very similar to product No 10, 'Crewfit Standard' but this product has zips replacing the Velcro to hold the covers and has a hydrostatic activation mechanism. Three fishermen selected this lifejacket and all considered it to be quite wearable and comfortable. Concerns were; the potential for the toggle to snag and keeping the covers clean.

Tank Test: Of the two samples tested one inflated quickly and supported the wearer well. The other did not inflate for several seconds but then inflated effectively. Both testers considered it comfortable in the in water situation.

Conclusion: A good effective lifejacket that is comfortable to wear. Its long length may not make it suitable for use in potting. (It should be noted that questions have been raised about the reliability of 'Hammer' hydrostatic mechanisms.)

Product No 15

International Safety 'Challenger' 150N auto **approx. price £70**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A halter style single chamber lifejacket with a rounded collar. The cover is orange PVC and is secured with Velcro. The belt has a stainless steel 'loop in loop' buckle and is fitted with the optional 'D' ring for attachment of a safety line. This lifejacket has interlocking lobes to combat water flushing into the wearer's face that can occur along the 'V' formed by the lobes on other lifejackets.

View: Seven fishermen have tried this product and the overall impression was that it is a lightweight lifejacket with robust wipe clean covers. It is comfortable to wear but comment was made that it can rub on the neck and chest. The toggle was considered prone to snagging and the belt buckle difficult to fasten when ones hands are cold.

Tank Test: The lifejacket was a little slow to inflate but did so fully and supported the wearer well. Both testers scored it 5 out of 5 for comfort in the water although, one tester found it tight around the neck (collar size 18).

Conclusion: A good effective lifejacket suitable for fishing.

Product No 16

International Safety 'Highline' 150N auto **Estimated Price £ 75**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A short length halter style single chamber lifejacket with a rounded collar that is worn high on the chest. The covers are orange PVC and are secured with Velcro. The belt has a stainless steel 'loop in loop' buckle and two options are tried, front and side fastening. This is a new product and a prototype model is shown. (See product No 26, Gael Force Hi-Line Pro for the developed product manufactured by International Safety Limited)

View: Reports from one fisherman who tried this product in the sea trials and confirmed by a discussion with the skipper of vessel carrying out intensive pot fishing, indicate that this is a very good lifejacket for use in fishing. The lifejacket has been developed to have a bayonet located gas cylinder, a window in the cover to be able to view it and zip fasteners. The loop in loop buckle has been changed to a push lock buckle to make it easier to use with cold hands. The four man crew of the potting vessel have worn these lifejackets and despite intensive use, handling hundreds of pots a day, the lifejackets are lasting over a year before needing replacement. No false activations have occurred.

Tank Test: Both samples inflated efficiently but, with one of the lifejackets, the inflated bladder at one side rode over the wearer's head. The other lifejacket performed as expected but the wearer complained that it felt very tight around his neck. See also product No 26 which gave a similar result with the zip version of this lifejacket.

Conclusion: The developed lifejacket, with bayonet gas cylinder, zip fastenings and the push lock buckle is considered to be very good. The short length ensures that it is not in the wearer's way when working and results in it being less likely to suffer damage. The in water performance seen in the test tank emphasises the need to ensure that the belt is tight and ideally a crutch strap should be worn.

Product No 19

ASPLI A36 155N auto **Approx. Price £89**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A halter style single chamber lifejacket with a rounded collar. The cover is red nylon fabric with the lower sections faced with red PVC. Velcro secures the cover and the belt has a stainless steel 'snap lock' buckle.

View: Five of these lifejackets were in the trial and the feedback from fishermen was that it is a fairly comfortable lifejacket having a flat unobtrusive design and durable wipe clean covers. The buckle was considered to be good as it is a simple snap lock design but complaint was received that the lifejacket rubbed on the neck. The Velcro fastening the covers becoming unfastened was another complaint.

Tank Test: Both testers thought that the performance was good; the head was well supported and clear of the water. One found it to be tight around the neck; this was resolved by deflating the lifejacket slightly. Score 5 out of 5.

Conclusion: A good lifejacket with flat design and robust wipe clean covers making it suitable for use in fishing. Replacing the Velcro with a zip would be a positive improvement.

Product No 20 & 21

Secumar 'Window Alpha 150N auto **Approx. Price £109**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A halter style single chamber lifejacket with a fold down collar that has a fleece comfort strip. The cover is blue fabric secured with Velcro and the belt has a plastic/stainless steel 'push lock' buckle. A clear plastic window covers the inflation mechanism allowing the green indicator to be readily seen. The window is secured with a zip giving easy access to the inflation mechanism.
This lifejacket is also available without the window for a slightly less cost.

View: The four fishermen trying these lifejackets considered them to be comfortable but one did complain that it was tight across the back of the neck. One experienced the toggle catching in netting with the result that the lifejacket inflated and comment was expressed that it was hot to wear in summer. Also, it was too flimsy for deck work.

Tank Test: Both samples inflated efficiently, with one lifejacket there was a slight (one second) hesitation whilst the second half of the cover released. Both testers found that the inflated lifejacket was tight around their neck and was not comfortable. One man found that the lifejacket was a little slow to right him and in wave conditions quite a lot of water was striking the face.

Conclusion: A comfortable lifejacket and the window facility results in it being very easy to check the mechanism and cylinder. The material is too flimsy for heavy use in fishing.

Product No 22

Ocean Safety 'Kestrel' 150N auto **Approx. Price £63**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A halter style single chamber lifejacket with a fold down collar. The cover is red nylon fabric and is secured by Velcro. Toggles are attached to the lifejacket. The belt has a stainless steel 'loop in loop' buckle and a crutch strap is supplied and fitted.

View: A very lightweight lifejacket but complaint was received that it rubbed on the neck slightly. The toggles for securing to a jacket were cut off to avoid snagging.

Tank Test: Both samples inflated efficiently but both testers complained that the crutch straps were uncomfortable. In wave conditions the loading around the groin area was unacceptable and both men released the crutch straps to find that all load was now being taken on the neck.

Conclusions: A lightweight lifejacket but the fabric is perhaps not robust enough for constant use in fishing.

Product No 23

Ocean Safety 'Commodore' 150N **Approx. Price £83**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A halter style single chamber lifejacket with a rounded collar. The cover is blue nylon fabric and secured by a zip. Toggles are fitted. The belt has a stainless steel 'loop in loop' buckle and a crutch strap is supplied and fitted.

View: Good reports were received from the six fishermen who tried this product. It was considered to be compact, easy to wear and lightweight. Comment was made that the cylinder can dig into ones chest when working and one fisherman experienced false activation. Keeping it clean was seen as a problem.

Tank Test: Both samples tested inflated rapidly and supported the wearers well in the water with a very good clearance for the mouth. The two sections of the bladder came together tightly and in wave conditions there was no flushing effect.

Conclusion: A good lightweight, comfortable lifejacket with good in water performance. Wipe clean covers and an easier to use buckle would improve the lifejacket.

Product No 24

Ocean Safety 'Sport' 150N auto **Approx Price £55**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A 'slim-line' halter style 150N lifejacket with a rounded collar. The cover is red nylon fabric and is secured by Velcro. The belt has a stainless steel 'loop in loop' buckle and is fastened at the side. A crutch strap is supplied and fitted.

View: A very compact lifejacket that had appeal to fishermen. However, after experience of wearing it comments were made that it is too solid and rubs on the neck. Worn over a T-shirt in summer it was fine but worn over oilskins it was unacceptable. The covers are wrapped quite tightly over the bladder and the Velcro securing the covers easily becomes unfastened.

Tank Test: Both samples were quick to inflate and the testers both found the lifejacket to be comfortable and gave them good support with their heads well out of the water. Scores of 4 out of 5 and 5 out of 5 were given.

Conclusion: Good in water performance, suitable for light use in summertime but, not in normal fishing conditions.

Product No 26

Gael Force Hi-Line Pro **Approx Price £80**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A single chamber short length, halter style lifejacket with a rounded collar. The cover is red nylon fabric secured with a zip and the belt is secured with a plastic push lock buckle. Supplied complete with a crutch strap.

See product No 16 for similar product made by International Safety Ltd.

View: Reports from three fishermen who tried this product in the sea trials indicate that this is a very good lifejacket for use in fishing. The lifejacket has a bayonet located gas cylinder, a window in the cover to be able to view it and zip fasteners. The buckle is a push lock type to make it easier to use with cold hands. No false activations have occurred but, the shape of the inflation pull makes it prone to tangling in netting.

Tank Test: Two versions were tested, automatic and manual. The automatic commenced inflation rapidly but the cover at the left side released only slowly resulting in the right hand side rising up and almost over the wearer's head. Once the left side released fully, the inflation of the bladder was even and the lifejacket supported the wearer correctly, although, it rode high. With the manual version the cover released rapidly and the inflation was more even. In calm conditions, the lifejackets supported the wearer's mouths adequately clear of the water but in wave conditions, water was flushing up to the mouths.

Conclusion: This lifejacket, with bayonet located gas cylinder, zip fastenings and the push lock buckle is considered to be very good. The short length ensures that it is not in the wearer's way when working and results in it being less likely to suffer damage. The in water performance seen in the test tank emphasises the need to ensure that the belt is tight and ideally, a crutch strap should be worn.

Product No 30

Guy Cotten Pecheur Waistcoat 50N **Approx Price £58**

An inherent buoyancy aid that conforms to EN393

Product description: A waistcoat/body warmer that has inherent buoyancy provided by a foam lining. The actual buoyancy depends upon the size of the garment: small - 66N, medium - 72N, large - 77N and extra large - 83N. The waistcoat is fastened with a plastic zip and has a waist belt with a plastic 'push lock' buckle. A crutch strap is fitted and has to be threaded through a loop and fastened down with Velcro when used. There are two external pockets and one internal sealed with Velcro. The garment is in navy nylon fabric and has reflective strips.

View: Very much liked by the five fishermen who tried this buoyancy aid as they considered it an ideal garment to wear, especially around the harbour and in the wheelhouse. However, most found it too hot to wear in the summer time. One comment was that the garment was too firm and when sitting in the wheelhouse chair the waistcoat was pushed up above the shoulders.

Tank Test: On jumping into the water, one sample floated up above the tester's shoulders, but he pulled it down and had reasonable buoyancy from the product. The second sample was worn underneath an oilskin top and this held it down giving good buoyancy. In wave conditions the mouths of both fishermen were dipping underwater.

Conclusion: A comfortable buoyancy aid which is easy to wear although possibly too hot in warm weather conditions. Fishermen like the concept of a buoyant waistcoat but need to be aware of the limited buoyancy.

Product No 31

Mulion 'Floater waistcoat' 50N **Approx Price £54**

An inherent buoyancy aid that conforms to EN 393

Product description: A waistcoat/body warmer with 50N of inherent buoyancy provided by the closed cell foam lining. The garment is made from waterproof fabric and is fleece lined. It has a two way plastic zip with a waist belt fastened with a 'push lock' plastic buckle. There are two external pockets plus one internal with a zip. A crutch strap can be fitted but was not supplied.

View: Very comfortable to wear and liked by the five fishermen who assessed it as it is a normal waistcoat that can be readily worn both on the vessel and around the harbour. It was considered to be ideal in cold weather but too hot to wear in warm weather conditions.

Tank Test: Both testers found that the buoyancy aid supported them reasonably well in still water conditions but in wave conditions, their mouths were being submerged.

Conclusion: A good comfortable buoyancy aid but likely to be too hot to wear in warm weather. Fishermen need to be aware of the limited level of buoyancy.

Product No 35

ASPLI Regatta 403 Hybrid 50N + 150N **Approx Price £ 113**
A combined inherent buoyant, 50N and inflatable 150N lifejacket that conforms to both EN 393 and EN 396

Product description: A waistcoat design that incorporates 150N of inflatable buoyancy with 50N of inherent buoyancy to ensure that minimum buoyancy will always be provided even if the inflation should fail. The product has a nylon fabric cover in orange with the front section faced with orange PVC. Velcro is used to fasten the cover and the main belt has a stainless steel 'loop in loop' buckle and a 'D' ring fitted. Two small belts with plastic 'push lock' buckles are fitted at the top and bottom of the waistcoat. There are reflective strips both at the front and back and double crutch straps are fitted and contained ready for use in a pocket at the back.

View: Only one fisherman selected a hybrid product as he wished to try something different. His experience after three months was that it was quite wearable but was bulky and restricting. He did comment that it was very durable and would 'last for ages'.

Tank Test: Inflation was rapid but both fishermen found the inflated lifejacket very tight around the neck and had to deflate it slightly. Support from the lifejacket was good, the head being well out of the water. In wave conditions some water was hitting the face.

Conclusion: A durable product that gives good buoyancy and can be guaranteed to always provide a minimum of 50N of buoyancy. Possibly, it is too bulky to be worn constantly when working on most fishing vessels.

Product No 37

Mullion Seefloat 150N Waistcoat Lifejacket **Approx Price £150**

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A waistcoat design single chamber lifejacket. The material is day-glow yellow nylon fabric and the waistcoat is fastened with a plastic zip. The belt has a stainless steel 'loop in loop' buckle and a crutch strap is fitted. The waistcoat has two small external pockets and a large internal pocket all fitted with a Velcro sealed flap. Reflective strips are fitted at both sides and front and back. Also, the belt is reflective.

View: Although four of these products had been issued to fishermen only one fisherman had actually chosen it from the range of products. It was found to be easy to put on and easy to wear but comment was made that it was slightly bulky and being loose fitting it could be a snagging hazard. One fisherman experienced false inflation.

Tank Test: Both samples inflated quickly and both testers found it to be comfortable and supported them well. In wave conditions, there was a little splashing to the face but not unacceptably so.

Conclusion: The assessment of this product has been minimal but, it does not seem to appeal to fishermen. The in water performance is good although, the price of £150 would deter many.

Product No 44

Viking 'Elka' Oilskin Top with 165N auto lifejacket **Approx Price £120**

Single chamber lifejacket, 165N that conforms to EN 396

Product description: An oilskin top that incorporates a 165N inflatable hydrostatically activated lifejacket that inflates externally. Velcro fastenings secure the covers over the lifejacket. An internal belt with a plastic 'push lock' buckle secures the lifejacket at the waist.

NO LONGER AVAILABLE

View: Although this product became unavailable during the course of the trials, fishermen did like the concept and four fishermen did select this product. Comments received were that although very similar to a standard oilskin top it is a little heavy and too bulky when working. Complaints were that the Velcro comes apart causing a snag point and that the Velcro allows water to leak inside in bad weather.

Tank Test: There was 4-5 second delay before one of the samples inflated, the second inflated after 2 seconds. The inflated lifejacket has a large volume, especially at the lower sections that projected out in front of wearer's head. Both fishermen found that they were not being supported by the lifejacket and in wave conditions their mouths were underwater repeatedly.

Conclusion: This is a good concept but the problems with the Velcro and the poor in water performance would need to be resolved before it would be acceptable to fishermen.

Product No 45

Guy Cotten 'Seafish Crewsaver' Oilskin Trousers 150N Approx Price £120
Single chamber lifejacket, 150N that conforms to EN 396

Product description: Bib and brace oilskin trousers that contain a 150N manually activated inflatable lifejacket ready for deployment in the bib pocket. The wearer rips open the pocket, which has burst open zips, and lifts up the folded lifejacket placing it over his head. He then tugs on the inflation mechanism lanyard to inflate the lifejacket.

The lifejacket section can be readily transferred to replacement oilskins.

View: Six fishermen assessed this product and found it reasonably comfortable to wear and considered it 'the closest thing to conventional oilskins'. Complaints were that it is a little bulky and that the cylinder digs into the stomach on occasions. The Velcro securing the ends of the zip was prone to coming unfastened. A major concern was that the cylinder can work loose. Wear was experienced on the outer fabric in the location of the cylinder.

Tank Test: This is a manually activated lifejacket that has to be removed from the bib pouch, slipped over the head and then inflated. One fisherman took 8 seconds to achieve this the other 10 seconds. One found it tight to pass over his head. Once inflated, the lifejacket gave good support, the pouch style bladder giving good lift at the front.
In waves the pouch bladder protected the wearer's mouth from splashing, but one fisherman found that the lifejacket tended to float up as the braces and belt were not tight enough.

Conclusion: A very wearable buoyancy device; almost standard oilskins. The gas cylinder may dig into the wearer when bending over and is prone to working loose. Good in water performance but manual deployment means it will not work if you are unconscious when entering the water.

Product No 46

Guy Cotten 'Secubib' Oilskins/Lifejacket 150N Approx Price £152

Single chamber lifejacket, 150N that conforms to EN 396

Product description: A halter style single chamber lifejacket that is worn as the braces of bib and brace oilskin trousers. The lifejacket has blue nylon fabric covers that are secured with Velcro fastenings. A waist belt retains the lifejacket to the oilskin trousers and this has a plastic 'loop in loop' buckle that fastens at the side. The oilskin trousers and the lifejacket are sold as separate items and hence, if the trousers become damaged, only that item will need to be replaced.

3D Top: An oilskin top is available with an expansion pleat to allow it to be worn over an inflatable lifejacket.

View: This was the product that most fishermen wanted to try and 26 were included the trials. The initial impressions were universally very good and fishermen consider the product to be comfortable and well designed. After some months of use, some complaints were received of rubbing on the neck, the cylinder digging into the stomach, being too bulky and too hot to work in during the summer. Several fishermen said that it took time to get the straps set up so that it fitted them well and it was commented that the fabric of the latest version of the lifejacket covers was stiff in comparison to the original blue fabric covers.

Tank Test: The lifejacket inflated rapidly and supported the wearer well. In wave conditions flushing occurred between the lobes of the bladder and water repeatedly hit the wearer's mouth. One fisherman was wearing the 3D top and this did prevent 'flushing' but, in severe waves, he did tend to dip under slightly.

Conclusion: Designed specifically for fishing, this product is very attractive to fishermen. It does take time to get used to wearing it and to get the straps correctly adjusted.

13. Discussion of Sea Trials

As can be seen from the foregoing, none of the products could be considered to be totally ideal. Indeed, it is likely that one fisherman's concept of ideal would differ from another fisherman's. For the most part, this was a trial of products that fishermen had selected and it is interesting to note the type of products that fishermen did not select.

13.1 Buoyant Thermal Suits

Several buoyant thermal suits were included in the range of products yet only two fishermen chose to try such a buoyancy device and in both instances these were requested in the winter months. Regrettably, reports of how they have performed have not been received, but it is a fair assumption that they will be ideal in cold weather conditions but simply too hot to wear during the rest of the year. Most of the fishermen were shown the range of products in March onwards and hence, they would be looking to the coming warmer weather when choosing an item to try. Many of the larger fishing vessels, particularly those working north in the winter time, do equip their crews with buoyant thermal suits and indeed, many individual fishermen on smaller vessels have invested in such suits for their own comfort and protection.

Although the suits were not assessed in sea trials, they were assessed in the tank tests, see section 9.7. In general, the suits will float the wearer horizontally but it is still possible to swim and assume an upright position. The mouth is easily kept clear of the water in both still water and in wave conditions. Because of the horizontal flotation, if the wearer should become unconscious they could float either 'face up' or 'face down'. Hence, it is recommended that a lifejacket is worn with these suits and it should be a high buoyancy one to be able to counteract the buoyancy of the suit and turn the wearer face up. Fishermen working on the deck handling fishing gear will probably find this impractical and hence, they need to be aware of the limitation of the suits. Of course, the big advantage of the buoyant thermal suits is the thermal properties which will help the wearer to overcome 'cold shock' and greatly extend survival time in the sea. It is perhaps a reasonable consideration that; if a fisherman can comfortably wear a buoyant thermal suit without being too hot, then it is possibly the best measure he can take to safeguard himself against the risk of falling or being swept into the sea. If a lifejacket can be worn with the suit, then the best lifesaving capability has been achieved.

13.2 Work Vests

Fishermen were very keen on the two waistcoats or body warmers that were available in the sample sets but none considered the industrial buoyancy aids or work vests. The reaction from the fishermen in the tank test was that these products are too bulky and have potential snag points on the belt buckle. It is assumed that this view was shared by the fishermen choosing products for the sea trials. The tank test showed that the flotation was adequate in still water but not sufficient to prevent mouths dipping under in wave conditions. The exception was a 100N work vest that performed well but, was still considered to be bulky.

Considering the products that were selected by fishermen, these can be categorised as; waistcoats/body warmers, inflatable lifejackets and oilskins with buoyancy devices.

13.3 Waistcoats/Body Warmers

Most fishermen were immediately attracted to the Guy Cotten or the Mullion waistcoats with a view that they would be easy to wear both, in the wheelhouse and underneath oilskins when working on the deck. They are not an obvious 'lifejacket type product' and are virtually normal clothing, ideal for wearing around the harbour. Ten fishermen did choose to try these buoyancy aids and on the whole, were quite pleased with them although, many expressed the view that they are too hot to wear in the summer time. The RNLI Safety Co-ordinators did make the fishermen aware of their limited buoyancy but the fishermen took the view that it is better to have a garment with limited buoyancy that I will wear rather than a good buoyancy lifejacket that I am unlikely to wear. These products are always likely to be in demand for use by skippers.

13.4 Inflatable Lifejackets

With the exception of one fisherman, all the lifejackets selected were 150N automatic. The exception was a big fisherman who chose a 275N lifejacket as it was in proportion to his size. Although, it is generally considered that in rough sea conditions large buoyancy will be beneficial, the interest of fishermen is focussed on which lifejacket will be easiest and lightest to wear. Hence, they looked at the wide range of 150N lifejackets that are available.

All of the lifejackets did prove to be readily wearable but, how durable they are depends on their use and the type of fishing. With five of the products, concern was expressed that they may not be robust enough for fishing; this was generally with the lower priced lifejackets. Many lifejackets have been developed for the leisure market and although they may be lightweight and effective lifejackets, they are not suitable for the rigors of fishing.

Complaint made with most of the lifejackets was of rubbing on the neck and of toggles being prone to snagging. Also, of belt buckles being difficult to fasten with cold hands, Velcro coming undone and covers that are difficult to clean.

One particular lifejacket stood out as being different and quite effective due to its short length design, the 'Highline'. This product is manufactured by International Safety Limited and it is believed that it is also supplied to Gael Force to be marketed under their name. Prototype versions by International Safety and market versions by Gael Force were evaluated in the tank tests and did give rise to concern as in one instance, the inflated lifejacket almost rode over the wearer's head. This was most likely due to the belt not being correctly tight and considering this, the Gael force product was included in the sea trials. The response from the fishermen who have tried it has been very positive and this is confirmed by the experience of Dylan Silverwood, a skipper carrying out intensive pot fishing operations. He and his three crewmembers have tried and rejected

most lifejackets over the past few years. Many only lasted for two or three months before becoming too damaged by the action of carrying the pots when stacking, the pots abrading against the lower section of the lifejacket. The Highline lifejackets are lasting a whole year. The crutch straps supplied with the lifejackets are being worn by the skipper and his crew which is reassuring in view of the test tank experience.

Most lifejackets have been well received and fishermen have found that it is practical to wear one whilst working. Fishing does involve long hours often doing repetitive work or very active physical movement handling the fishing gear in quite cramped conditions on today's vessels. It is essential that the lifejacket is as unrestrictive as possible. The flat design that most manufacturers have adopted does result in a lifejacket that stays flat to the chest and out of the way. However, the complaints or comments gained from fishermen could help to develop the lifejackets further.

Rubs on neck: This criticism was probably received with respect to all products and it is perhaps difficult to resolve. A strip of soft material in the way of the neck may help but, keeping such material clean may be a problem. Perhaps, fishermen could offset this problem by wearing T-shirts with a collar to prevent direct contact between the lifejacket and their neck.

Belt Buckles: A fisherman may put his lifejacket on many times a day for each 'haul' in trawling. In other fisheries, such as potting, he will wear it continuously for several hours. Whatever the pattern, having an effective belt buckle is essential. Many products have a stainless steel 'loop in loop' buckle which is obviously very strong and presumably cost effective. Unfortunately, it is quite difficult to operate with cold hands. Fishermen preferred the 'push lock' or the 'snap clip' type of buckles which are quick and easy to use. Retaining the belt tight is an essential requirement if the lifejacket is to be effective in the water and it would seem that the belts on many lifejackets easily work loose. The plastic 'push lock' buckles are perhaps better than the stainless steel 'loop in loop' buckles for gripping the belt material but an effective means of locking the belt does need to be in place. Fishermen who are experienced at wearing a lifejacket often cut the excess belt off and tape the end tight to the belt with PVC tape to prevent the belt from slackening off.

Cleaning: Fishing usually results in getting covered with something; mud and fine sand from potting ropes, fish scales and fish guts, rust or grease from wires and equipment and of course, salt water spray. Wipe clean covers are very desirable to be able to keep a lifejacket reasonably clean.

Fastenings: The use of Velcro to hold the covers is a feature of the design of many lifejackets and works well to give an effective means of fastening that will burst open readily when the lifejacket inflates. Unfortunately, once Velcro has become contaminated with fine sand or fish guts etc it no longer holds so well and fishermen found that their lifejacket was constantly 'coming apart'. Zip fastenings do appear to offer a more secure method of fastening.

Toggles Snagging: Aside from the small plastic toggles that some lifejackets are equipped with to secure the lifejacket to a jacket, (these can easily be cut off) a lot of fishermen commented about the toggle snagging, presumably referring to the manual inflation lanyard. Most automatic lifejackets have a round bead on the lanyard hanging down 25–50mm at the bottom or, on the lower side of the lifejacket. This is quite likely to snag on many things on a fishing vessel, especially netting. A practical suggestion with an automatic lifejacket is to tuck the bead into the cover by parting the Velcro to pass it inside or, with zip covers, tuck it in at the bottom of the zip. Obviously, this does mean that in the event of the automatic mechanism failing, the cover would have to be ripped open to manually activate the lifejacket. This is questionable but, the nuisance and potential danger of the lifejacket suddenly inflating because the lanyard bead has snagged, justify this slight risk.

Durability: In trying to achieve a durable lifejacket it is obviously a compromise with lightness and comfort to wear. Everyone wants a lightweight easy to wear lifejacket that has nice soft flexible material but at the same time they want it to resist abrasion and puncture. The lower sections certainly need to be reinforced as that is where abrasion will occur and this should ideally be with wipe clean materials. Durability also includes the fastenings and as previously stated, contaminated Velcro will let the product down.

Cylinder Location: Many fishermen complained that the bottle (gas cylinder) dug into their stomach or chest when they were bending over, especially when bending over the vessel's rail to reach fishing gear. In many lifejackets the cylinder and inflation mechanism are located quite low down and if they could be positioned higher it would eliminate the problem and lessen the risk of the bladder chaffing through as it is regularly pressed and rubbed against the cylinder.

Crutch Straps: Many lifejackets are supplied with crutch straps but it is believed that few fishermen regularly wear them. How vital the crutch straps are to the performance of the lifejacket perhaps, needs further investigation? It is likely that most fishermen are wearing a lifejacket with a belt that easily works loose and would find the lifejacket riding up if they ended up in the water.

Life of the Lifejacket: Perhaps there is an unrealistic expectation with fishermen that the lifejacket that has cost under £100 should last for ever. He would expect to replace his oilskins within a year but will complain that the lifejacket is starting to fall apart. Servicing of a lifejacket is expensive and also a big nuisance if you have to send it away. As these lifejackets are being used as 'personal buoyancy devices' the fisherman could service his own lifejacket but a re-arm kit will cost £10 - £20. It is possibly desirable that all involved, manufactures, suppliers and fishermen view the lifejacket as having a life of 12-18 months after which it is replaced.

13.5 Oilskins with buoyancy devices

This type of product has a strong appeal to fishermen because they do need to wear the oilskins for fishing and it is ideal if the oilskins are also a buoyancy device. The Guy Cotten Secubib oilskin trousers were chosen by 26 fishermen and more would have been selected if a decision had not been made to limit this product to be able to test a wider range of products. Other oilskin buoyancy devices were the Viking Elka oilskin top and the Guy Cotten Seafish-Crewsaver oilskin trousers.

The Viking Elka top is no longer available but the concept is good and is worthy of consideration by manufactures. In contemplating the approach of having a lifejacket incorporated into oilskins the question is whether to have the buoyancy device in the top or the trousers? Placing the lifejacket in the top may appear easier but, in good weather the oilskin top may not be worn. Incorporating the lifejacket into the trousers will ensure that it is being worn most often but, what happens when the oilskin top is worn over the lifejacket? A major concern is that the inflating lifejacket under the top will restrict the wearer's breathing. Two solutions have been tried.

Seafish-Crewsaver Bib and Brace: This was the first solution which resolved the problem by having a manually activated lifejacket stored in a pouch forming the bib of the oilskin trousers. In use the wearer has to rip open the pouch, slip the lifejacket over his head and pull the lanyard. If an oilskin top is being worn it will need to be opened if the jacket type or, pulled off over the head if the cagoule type. This can be achieved in a matter of seconds, even in the water. The manual activated lifejacket avoids the problem of false inflation, and because it is in the pouch the lifejacket it is readily available without it being continually around the fisherman's neck. Of course, if the person is unconscious when entering the water it will not be of any use. The number of instances when a fisherman has been unconscious on entering the water is probably very low and fishermen are attracted to these oilskins as they are virtually their normal bib and brace oilskin trousers. Comments have been received that the oilskins are a little bulky and that the cylinder digs into ones stomach. A serious complaint is that the bladder suffers abrasion against the cylinder and the cylinder can worked loose. Addressing these problems would improve this product. From the tank tests it was observed that this lifejacket performed better than many others in wave conditions as the bladder is a single section in front of the wearer and this prevents the waves from striking the face. All other lifejackets were halter style, prone to waves flushing between the two sections. The oilskin trousers also act as a crutch strap and prevent the lifejacket from riding up.

3D Top: The second solution was to have an automatic lifejacket forming the braces of the oilskin trousers and to supply a special expanding oilskin top to wear over the lifejacket. This is marketed as the 3D Top and has a pleat section let into the front with a plastic zip that holds the pleat folded. A Velcro flap covers the zip to give a clear snag free face to the front of the oilskin top. Should the lifejacket being worn underneath the top inflate, then the Velcro and zip burst open allowing the extra material of the pleat to create space for the inflating lifejacket. In the tank test trials this did not happen fully and the pleat had to be

aided open by the wearer. It was found that a jacket type oilskin top with press studs to fasten it did open quite easily when worn with an inflatable lifejacket underneath it.

Secubib Trousers: These are standard Guy Cotten oilskin bib and brace trousers with a halter style lifejacket forming the braces. The lifejacket is separate to the trousers and attaches to a waist belt inside the trousers and to the bib section. Both lifejacket and trousers can be bought individually. Comments from fishermen were generally positive saying that it is comfortable and well designed but, it did take time to get the straps ideally set up and to get used to wearing it. Some complaints were received of rubbing on the back of the neck and of the cylinder digging into the stomach but, otherwise, most fishermen found the oilskins and lifejacket very acceptable. Comment was made that the latest versions of the lifejacket have orange PVC covers, the same material as the oilskins and these result in a lifejacket that is not as comfortable as the original blue nylon fabric covers.

The tank test showed that the lifejacket was on par with most other halter style lifejackets; performing well in still conditions but with problems of water hitting the mouth in wave conditions. An advantage with this lifejacket is that the trousers form a crutch strap keeping the wearer well supported.

13.6 The Ideal Buoyancy Device?

At the start of this section, discussing the information gained from the trials, it was suggested that none of the products were ideal and although there may be differing views on what would be ideal, it is possible to list desirable features.

Buoyancy Type: Inflatable buoyancy of 150N would appear to be the most suitable. Having more buoyancy may seem desirable to provide a better in water performance but this will increase the bulk and the weight of the lifejacket and fishermen will be less inclined to wear it. Inherent buoyancy products are either very bulky in order to achieve an acceptable buoyancy level or, have minimum buoyancy and will not correctly support an unconscious wearer. For most of the year they will be too hot to wear when working.

Covers: Wipe clean materials certainly need to be used for at least the lower section. The material needs to be flexible and where it will bear on the wearer's neck it needs to soft without a hard fold or seam. The lower section needs to be robust to resist abrasion/snags and the less it extends down the chest, the more it will be out of the way.

Fastenings: Unfortunately, Velcro easily becomes contaminated on a fishing vessel and then will not hold securely. Zip fastenings appear to offer a secure means of holding the covers and are preferred. It may be that after 12 months of use on a fishing vessel, the zip is too clogged with sand, dirt and salt to be able to repack the lifejacket. However, provided that it can be relied upon to bust open to allow the lifejacket to inflate, it will be acceptable. An alternative may be press studs.

Belt & Buckle: The plastic push lock type of buckle is preferred as this can be easily used with cold hands and the belt does not need to be slacked off to be able to fasten the buckle. Alternatively, the stainless steel snap clip buckle is quick and easy to use. The belt material needs to be effectively locked either by the buckle or the length adjuster. The nylon belts used on most products appear to easily slide in the buckle or adjuster and become slack.

Mechanism and Cylinder: Automatic inflation is desired by most fishermen and the mechanism needs to be reliable and not susceptible to false activation. The reliability of the 'Hammer' hydrostatic mechanism is understood to be in question and hence, a soluble system will need to be used. To avoid the cylinder and mechanism digging into the wearer's stomach the cantilever type mechanism should be used to minimise the length of the assembly and be located as high up as possible.

Manual Activation: The bead or toggle on the end of the lanyard needs to be in a position where it will not be prone to snagging. Perhaps it could be high up on the lifejacket possibly protected by a flap secured with a zip or press studs.

Crutch Straps: Crutch straps are likely to be viewed by most fishermen as a major restriction and yet it would appear that they may be needed to prevent the lifejacket riding up. This will be especially so with short length lifejackets which result in the belt being worn up above the waist. If crutch straps are essential, they need to be comfortable and easy to fasten.

Oilskins with Lifejacket: The approach of incorporating the lifejacket with oilskin trousers is well received by fishermen. Perhaps oilskin manufacturers could incorporate anchor points inside the waist section for the attachment of a lifejacket, the trousers would then be an effective crutch strap.

14. Conclusions

1. **Tank Test:** Having fishermen try a whole range of buoyancy products in a test tank has proved to be a useful exercise and all involved considered it worthwhile.

2. **Wave facility:** Testing in wave conditions is essential as products that appeared to be quite effective in 'still water' conditions were observed to be not so effective in waves. Splashing to the face occurred and with low buoyancy products, the wearer would dip under the water.

3. **Size matters**: The size of the wearer matters, because on persons of a 'big build' the products did not always fit well and the wearer was not correctly supported in the water. A particular problem was that of the inflated lifejacket being very tight around the neck of big men.

4. **Failure:** One product, the Viking RescuYou 'Mariner' 150N automatic lifejacket was considered to have failed the tank test stage. Four samples of it were assessed and with three of these, the lifejacket cover did not release correctly resulting in uneven inflation of the bladder. In one instance, the pressure on the bladder was too great and the bladder burst; a total failure. With the others, the wearer was still supported and could have assisted the cover open allowing the lifejacket to fully inflate.

5. **Acceptable Products:** Not all of the available products were selected by the fishermen for evaluation at sea. Hence, the following list of products that fishermen found acceptable is not exhaustive and other products may be quite suitable.

   Inflatable Lifejackets: (Alphabetical order)

   - APSLI A36 155N auto with wipe clean covers
   - Crewsaver Crewfit 150N auto standard
   - Crewsaver Crewfit 150N auto hydrostatic *
   - Crewsaver Voyager 150N auto hydrostatic *
   - Gael Force Hi-Line Pro 150N auto
   - International Safety Challenger 150N auto
   - International Safety Hi-Line 150N auto
   - Mullion Neptune ECO 150N auto
   - Mullion Neptune 150 CE auto
   - Mullion Mariner 275N auto
   - Ocean Safety Commodore 150N auto
   - Secumar Window Alpha 150N auto
   - Viking RescuYou Conquest 150N auto.

   * Note; concern has been expressed about the reliability of the 'Hammer' hydrostatic mechanisms fitted.

Buoyancy Aids:

- Guy Cotten Pecheur waistcoat
- Mullion Floater waistcoat

Oilskins with Lifejacket:

- Guy Cotten Seafish-Crewsaver Oilskin Bib & Brace Trousers
- Guy Cotten Secubib Oilskin Bib & Brace Trousers with Lifejacket

6. **Concerns**: with many products are:

    - Velcro fastenings that become contaminated with sand, fish bits etc and are no longer secure.
    - Not possible to easily keep the product clean.
    - Belt buckles that are difficult to operate, especially with cold hands.
    - Belts easily become slack.
    - Cylinder and mechanism digging into the wearer's stomach.
    - Lifejacket rubs on the wearer's neck.
    - Support for the wearer in the water, especially splashing to the mouth in wave conditions.

7. **Desirable features include:**

    - Wipe clean covers.
    - Zip fastenings.
    - Plastic push lock belt buckles.
    - Effective belt locking.
    - Protection for the wearer's neck.
    - Cylinder and mechanism to be located high up in the product where it will not dig into the wearer's stomach.
    - Manual inflation lanyard bead/toggle to be positioned where it will not easily snag on items.

8. **Expectations:** Fishermen need to be realistic about the life of a lifejacket and appreciate that it is not a 'buy and forget' item. It will need to be hung up to dry after use and needs to be checked regularly for damage or for the cylinder working loose. With intensive use it will need replacing every 12-18 months and it will probably be more cost effective to replace it rather than pay for servicing.

Appendices

Appendix 1

Expenditure on the trials project

Expenditure

This is a joint project with RNLI staff largely carrying out the contact with fishermen and Seafish mainly undertaking the administration role. Funding is a 50/50 basis with Seafish providing the working budget for the purchase of products etc. Management of the project is a joint responsibility. FIFG grant has been awarded both by DEFRA and SEERAD on a 50/50 basis and 50% of approved eligible costs may be claimed.
The following summarises the principle expenditure since a joint project was agreed.

Consultation meeting SECC Glasgow April '03

Costs of invited participants		£1800
Cost of meeting room and refreshments paid by RNLI		£ 800

Products for tank tests

Two complete sets with, where appropriate, re-arm kits.	£8064 + VAT	£9476

Costs of Tank Tests July '04

Hire of Fleetwood test tank	£950 + VAT	£1116
Costs of invited participants		£1926
Costs of hotel, dinner, bed and breakfast 24 rooms		£1430
Video film crew	£1587 + VAT	£1865

Post tank tests

Editing video into separate manufacturers	£1200 + VAT	£1410
Re-packing lifejackets	£ 187 + VAT	£ 220
	Sub Total	**£20043**

Products ordered for fishermen up to 31st March 2005

ASPLI			
A36 L/jkt	7		
Secumar Window L/jkt	3		
Regatta Hybrid	1		
Newton flotation suits	2	£1340.47 + VAT	£1575
Cosalt			
Crewfit 150N Hammer	6		
Crewfit 150N Std	6		
Voyager 150N Hammer	4	£1552.22 + VAT	£1824

Products ordered for fishermen cont.

Fladen				
	70N Smocks	2		
	Flotation vest	1	£233.00 + VAT	£274
Gael Force				
	Hi Line Pro 150N	10	£995.00 +VAT	£1169
Guy Cotton				
	Secubib oilskin + L/jkt	18		
	3D Oilskin top	9		
	Flotation waistcoat	6		
	Seafish oilskins	9	£2782.68 + VAT	£3270
International Safety				
	Challenger 150N	10		
	Hi Line 150N	4	£890 + VAT	£1046
Lalizas				
	Sigma 150N	6		
	Omega 150N	6	£467.64 + VAT	£550
Mullion				
	Mariner 275N	1		
	Neptune ECO 150N	5		
	Neptune CE 150N	4		
	Aquafloat suit	1		
	Floater waistcoat	5		
	Seefloat waistcoat 150N	6	£1603.34 + VAT	£1884
Ocean Safety				
	Commodore 150N	1		
	Sport 150N	10		
	Kestrel 150N	4	£1276.27 + VAT	£1500
Seasafe				
	Treker top + Ljkt	2		
	Smock + L/jkt	2	£539.80 + VAT	£634
Viking				
	Worksuit + L/jkt	1	£151.20 + VAT	£178
	Totals	**152**	**£11,831 + VAT**	**£13,904**

To be tank -tested.

Total Expenditure, including VAT £33,947

Products ordered for fishermen since 1st April 2005 up to 14th June 2005

ASPLI			
Secumar window L/jkt	3		
Secumar Alpha L/jkt	1	£471.17 + VAT	£554
Cosalt			
Crewsaver Crewfit Std L/jkt	1		
Crewsaver Voyager	1	£185.20 + VAT	£218
Fladen			
Flotation Smock	1	£55.32 + VAT	£65
Guy Cotton			
Secubib oilskin + L/jkt	7		
3D Oilskin Top	7		
Seafish bib & brace + L/jkt	5		
Pecheur Flotation waistcoat	1	£1268.36 + VAT	£1490
Lalizas			
Omega 150N L/jkt	1	£65.84 + VAT	£77
Mullion			
Neptune 150N L/jkt	2		
Seafloat 150N	1		
Floater waistcoat	2	£367.61 + VAT	£432
Ocean Safety			
Commodore 150N L/jkt	1	£65.84 + VAT	£77
Viking			
RescYou Mariner 150N L/jkt	4	£237.42 + VAT	£279
Totals	**36**	**£2507.8 + VAT**	**£2946**

Total expenditure to 14th June 05 £36893 incl. VAT

Project Statement 14th June 2005

Expenditure to date **£36893 incl. VAT**
(Staff time not included)

Staff costs (Grant purposes only)
The staff costs approved for FIFG grant purposes are:

RNLI Safety Co-ordinator Scotland – 90 man days	£5200
RNLI Safety Co-ordinator Southwest – 90 man days	£5200
RNLI Water Safety Manager – 15 man days	£1500
Seafish Safety Engineer – 40 man days	£6900
Total	**£18,800**

The actual time spent on the project has been far in excess.
However, this is the basis of the FIFG grant. (See appendix III)

FIFG Grant to be claimed.

SEERAD eligible costs	£27400
DEFRA eligible costs (Misc. costs were excluded)	£23317
Total	**£50717 ex VAT**

50% grant claim **£25358**

Expenditure less grant claim **£11535**

Project is a 50/50 cost share with RNLI

Amount to invoice RNLI 50% of £11535 **£5767**

Less £800 for meeting room & refreshments paid
by RNLI at SECC April 2003.

Total to invoice RNLI (without VAT) **£4967**

Appendix II

Notes of Consultation Meeting in Glasgow April 2003

RNLI/Seafish Acceptability Trials

Notes of meeting with fishermen and trainers Glasgow April 03

Attendees:

Jason Rudd,	Skipper Newhaven
Mick Scott,	Skipper Newhaven
Sam Scott,	Future fisherman Newhaven
George Traves,	NFFO
George Geddes,	SFF
Keith Bower,	Trainer Brixham
Gary McKie	Trainer Kirkcudbright
Lachie Paterson	Trainer Carradale
Eddie Stiven	Trainer Glenelg
Jim Williamson	Training Co-ordinator WSFITA
Cliff Brand	MAIB
Pat Bonner	MCA
Ian Benham	RNLI
Simon Armstrong	RNLI
Carl James	Seafish
Alan Dean	Seafish

Invitees who could not attend were:

Paul Martin	Trainer Skegness
Phil Bray	Trainer Milford Haven
Ben Kirby	Vessel owner Helston Cornwall
Dylan Silverwood	Skipper Bridlington

Background

Approximately a year ago Seafish produced a project proposal for wide-scale acceptability trials to identify lifejackets/buoyancy devices that can be recommended for use by fishermen. The proposal was for ten groups of ten fishermen assessing a full range of products in various localities around the UK. The project was fairly comprehensive and included incentive payments to ensure that fishermen would persevere with long term assessment of products, payment of group managers and Seafish staff time, resulting in an overall cost of £250,000. FIFG grant funding was requested but a deficit of £87,000 still needed to be found and RNLI considered becoming involved and contributing the shortfall. The whole project was reassessed and a less ambitious project discussed. It was suggested that acceptability trials in one area with fishermen engaged in a variety of fishing methods and assessing selected products would be sufficient. The results would be published and made available to all fishermen. However, though this would be quite valid, the advantage of the wide-scale trials is that awareness of lifejackets/buoyancy devices would be raised in all the areas where the trials take place. Rather than just RNLI/Seafish determine the project,

it was decided to have a meeting with invited ‘key people’ to discuss and help to define the scale and structure of the project.

Comments received prior to the meeting

Dylan Silverwood, a leading fisherman operating from Bridlington was unable to attend the meeting but informed Seafish of his views and experience.

He and his crewmembers have tried various lifejackets over recent years and have found them uncomfortable to wear and that they rapidly become worn or damaged. They work large numbers of pots and when handling the pots the bottom section of the lifejacket gets in the way and the pot rubs against it. Currently they are trying out a new product for a lifejacket manufacturer and this appears to be ideal. It is an automatic inflatable lifejacket that has a short length and hence leaves the lower chest area clear enabling the wearer to work freely.

Dylan will keep us informed of the experience with this new design and hopefully, we can arrange for other fishermen to try it.

Ben Kirby is a vessel owner in Helston, Cornwall and experienced the tragic loss of a crewman by drowning five years ago. Ben has sent a letter that is copied at the end of these notes. However, the key points are listed below:

- Velcro does not effectively hold the covers in place allowing the toggle to fall out and catch in netting.
- Zip fastenings appear much better although, these also fail.

- Lifejackets rub on the back of the neck causing sores.

- Manufacturers do not give any guarantee with their lifejackets.

Notes of the meeting

Alan Dean gave a brief resume of past work:

Trials were conducted some ten years ago with a range of lifejackets but despite initial enthusiasm, fishermen invariably stopped regularly wearing them after a few weeks taking the attitude of, ‘’I’ll wear it when it’s rough’’. It was concluded that the lifejacket should be part of the fisherman’s sea gear such that, he would be wearing it without having to make a conscious effort. Hence, Seafish embarked on the development of the oilskins with ‘Crewsaver Limited’.

The oilskins seemed to be a very good solution but were limited to manual activation only because automatic inflation underneath an oilskin top could restrict the breathing of the wearer. Guy Cotten have marketed the oilskins and although sales in Denmark and France have been very good only 50 were sold in the UK during the first year. Cost is one problem, the combined oilskin and lifejacket is £120 but, an owner wishing to supply his crewmen with a lifejacket, to

comply with health and safety requirements, can buy an automatic lifejacket for around £60 or less.

Health and Safety Legislation has resulted in a big change in attitude towards the wearing of buoyancy devices and many crewmen have been equipped with a lifejacket as PPE (personal protective equipment). It is considered that few fishermen are regularly wearing their buoyancy device and those that do, find that the products are wearing rapidly or, that fastenings repeatedly come undone. Some items are uncomfortable to wear for prolonged periods and reliability concerns have been expressed with inflatable lifejackets.

In view of the need to be able to advise fishermen on products that are suitable for fishing conditions acceptability trials are being proposed. The object of this meeting is to listen to informed viewpoints in order to ensure that the trials are sensible, are properly planned and will meet the needs of fishermen.

Ian Benham pointed out that the Sea Safety Group, chaired by Capt. Starling-Lark, had undertaken an initiative to look at the development of improved buoyancy devices for fishermen and he wondered how this related to the work we were considering. Both Keith Bower and Alan Dean had been involved with the Sea Safety Group and were able to summarise the outcome. Mullion Manufacturing had developed a jacket-coat incorporating an inflatable lifejacket and a locator beacon. The jacket is very good and will be ideal for use on pilot boats and patrol vessels. However, at a cost of around £400 it is not likely to be bought by fishermen. A more suitable product for use by fishermen is the waistcoat lifejacket that Mullion also developed. This has been well received by those who have seen it and we would expect it to feature strongly in any trials we conduct.

Ian Benham gave some of the RNLI statistics; 80% of fatalities are as a result of persons ending up in the water and 40% of the deaths that RNLI have to deal with are fishermen. RNLI has devoted considerable resources to the development of lifejackets to meet the specific demands of lifeboat crews and over a ten year period has overcome the resistance of lifeboat crewmen to the wearing of lifejackets.

George Geddes commented on the experience that was gained recently when his vessel was used for the making of a safety awareness video. When trying various recovery systems it was observed that the lifejacket hindered the man in the water making it difficult for him to move his arms and unable to see a rope throw across him or to manoeuvre in the water. It was found beneficial to reduce the buoyancy of lifejacket giving the casualty more freedom of movement and enabling lifting strops to be passed around the casualty. George suggested that it was preferable to have a buoyancy aid with inherent buoyancy and have a ‘top up’ facility.

Eddie Stiven spoke about his experience with fish farm staff who under shore based health and safety legislation have had to wear PPE years before the fishing industry. Initially, all staff were equipped with 150N inflatable lifejackets but after an 18-month trial period there had been 17 immersions and 8 failures of

lifejackets had been experienced. The fish farm industry has now moved to 50-100N work vests. Eddie commented that details are very important such as, straps that do not become loose or catch easily on obstructions.

Alan Dean asked if the group should consider establishing a particular level of buoyancy for products to be considered.

George Geddes stated that although on vessels such as pursers the owners can insist on the crewmen being totally equipped, on the average white fish vessel, where work is much more intensive, the crewmen would be reluctant to wear lifejackets. A work vest will be much more acceptable.

Alan Dean suggested that perhaps the group should consider all types of buoyancy device, assemble them together and try each item in a pool before going forward with trials.

Keith Bower stated that the need was to change attitudes, to educate the industry. He gave the example of a good approach by Nick Chapman who operates a netter from Padstow. All the crew wear ‘Crewsaver’ lifejackets but these are worn on top of a polo neck shirt to protect the neck and oversize oilskin tops are worn to give room for inflation if necessary.

Keith explained that he has worked with the RNLI lifejacket in training sessions and although the lifejacket gives superb buoyancy, brilliant for keeping the wearer afloat, it has various shortcomings such as difficulty in finding the oral inflation tube and interaction with the helmet that lifeboat crews wear, etc. This illustrates that despite every effort and resources it is very difficult to manage to get every aspect just right.

Keith suggested that there is a need for a new product, a 150N device giving front buoyancy. It needs to be unobtrusive, very resistant to wear and something that can be worn on its own. He put forward the idea of a waist belt with braces attached, the braces expanding to create the lifejacket. A new approach should be considered, buoyancy other than by inflation, perhaps some chemical that could be activated to expand as foam and create the necessary buoyancy.

Alan Dean questioned whether the group would wish to include all available products in acceptability trials or just to try to identify those products that the group judge to be appropriate. Also, should the project look at the design of products with a view to creating a new approach as Keith had suggested?

Seafish had tank tested automatic lifejackets used by fishermen over periods ranging from 6-18 months. Of 19 lifejackets tested two failed totally and would not have given any buoyancy, with two more partial failures that required manual activation of the lifejacket. Although servicing of these lifejackets had not been carried out, they were typical of the condition of lifejackets that will be found on fishing vessels and hence, there is a concern about reliability with inflatable products.

Jason Rudd informed the group that he wears the Seafish oilskins plus a body warmer with 50N of inherent buoyancy. This combination ensures that he has immediate buoyancy if he should fall into the water and has the 150N buoyancy of the manually activated lifejacket in the pouch of the oilskins if he needs it. Jason considered that the biggest problem with lifejackets is that they are not durable and not 'cleanable'. From the range of products that were on the display at the meeting he selected the Guy Cotten 'Secubib' (oilskin bib and brace trousers with an automatic lifejacket attached to the braces) as the best available product for fishermen. However, he considered that the lifejacket section was not easily washable.

Lachie Paterson commented that he did not think that any single product would be the answer for all the industry. He felt that any trials would need to prove that each product did what was expected. The trials were also needed to raise awareness in the industry and from the trials it was probable that there would be a need to look at the detail design of products.

George Geddes stated that one of the best lifejackets he had experienced was one designed for the leisure market for fly fishermen as this was compact and lightweight.

Alan Dean observed that the manufacturers failed to advertise products that are available and rely on selling through chandlers who invariably only stock a limited number of products. Perhaps many more buoyancy devices would be sold if they were well advertised and fishermen could order by giving credit card details.

Pat Bonner stated that as an MCA Surveyor he sees many lifejackets hanging on pegs on the vessels but he doubts that very few are regularly worn. However, he does think that there is a change of attitude about lifejackets in the fishing industry. Pat suggested that rather than organising a whole programme of trials it would be preferable to let the industry trial products by giving a discount to the fisherman when he buys the product and then getting 'feed back' from him about his experience with it. Tank testing would be unnecessary expenditure as all products will have passed conformity tests and the money could be better spent on discounting lifejackets for fishermen. It was important to change the attitude of fishermen to make them receptive to the wearing of buoyancy devices.

Alan Dean clarified that the tank tests envisaged were not to provide detailed performance results for lifejackets but simply to ensure that items, particularly buoyancy aids did achieve a reasonable level of buoyancy when worn with sea gear, i.e. Wellington boots, oilskin clothing etc. The tests that the manufacturers have to achieve are done with the wearer dressed in swimming trunks. It was intended to test all products quickly in a tank to see how the item performed and then move on to acceptability trials.

George Geddes pointed out that attitudes are changing; simply look at the pelagic fleet, lots of money and plenty of incentive for crewmen to wear safety equipment. Unfortunately, the vast majority of fishermen are not in such a wealthy position and the crew structures on vessels can make it difficult to improve the safety culture. Fishermen working 'single handed' are much more

inclined to wear a lifejacket than fishermen on vessels with multiple crews. Youngsters are easy to convince of the need to wear buoyancy devices but with older fishermen it is problematic.

There is a need to examine every minute detail in the design of buoyancy devices. The cost is perhaps the biggest issue, it was got to be both cheap to buy and wearable.

In considering our proposed trials, it is likely that we could narrow all the products down to 10 or 11 items. We need to consider how much buoyancy is needed as less is going to be better for 'wear ability'.

Cliff Brand stressed that the buoyancy devices have to be wearable. MAIB almost invariably find when investigating accidents that lifejackets have not been worn. He suggested that we should narrow down the range of products and get fishermen wearing them for three to four months to form a judgement.

George Geddes stated that we should only try products that are deemed to be good.

Keith Bower made the point that only trials with fishermen will be able to assess wear ability; it is one factor that the manufactures cannot readily assess. A tank test does assess reliability and indicates if the item does provide effective life saving capabilities. He proposed that we should tank test, carryout acceptability trials at sea and then tank test again.

Lachie Paterson expressed concern about insurance implications and indeed, are not fishermen now expected to wear a lifejackets?

George Traves spoke of the 'Progress' case at Hartlepool in which there was a successful appeal against a court decision that the crewman should have been wearing a lifejacket.

Alan Dean stated that such an appeal would not be successful now because of the publicity there has been about the need to wear buoyancy devices and the 'M Notice' that has been issued.

In considering the proposed trials what actions would the group suggest?
Do we:

Cover all the fishing methods, e.g., when working pots or creels the buoyancy device will be worn all the time whereas, in trawling it will be put on and taken off several times a day?

Assess all available products?

Identify the fishing methods and offer a range of products that we consider suitable?

Should we assess any product that fishermen may consider using or should we use our judgement?

Do we offer incentive payments to ensure that fishermen will persevere and wear the item for a reasonable period?

How do we monitor the results?

Are the people around the table willing to contact and work with fishermen in their area? There was general agreement that they would.

Jason Rudd commented that incentive payments were not a good idea, we just need to work with the right fishermen.

Lachie Paterson suggested that we should look into all available research and wondered if research had been carried out in other countries.

Keith Bower pointed out that 150N had become an accepted minimum level and was this a stumbling block to considering items with less buoyancy? We should also consider items such as the military type lifejackets that are available as these are very short and are not restrictive.

Pat Bonner suggested that the trials were not necessary and subsidies for fishermen to purchase lifejackets would be more effective. A questionnaire filled in by the fisherman would enable the suitability of the products to be assessed.

Eddie Stiven stated that we should stop referring to the products as ‘lifejackets’ as this causes confusion with lifejackets approved for abandon ship purposes. We are considering PPE (personal protective equipment) and this covers a whole range of items some identified as lifejackets, others as buoyancy aids. We should be referring to CWBA (constant wear buoyancy aids)

Eddie suggested that we should assess a whole range of products all around the country and on a wide range of vessel types. ‘The bottom line’ that we are trying to achieve is to be able to advise a fisherman on what ‘kit’ he should use. The working group should become an interface between fishermen and manufactures and interchange information in both directions.

George Traves commented that it was the FISG (Fishing Industry Safety Group) meeting on the 8 May and he felt that the work that we were discussing with CWBA should be on the agenda. There is a need to keep safety issues moving forward and discussion at FISG would increase support for trials.

Alan Dean suggested that as had been previously discussed, RNLI staff would go around the exhibition to identify products that could be considered for the trials and it would be beneficial if all at the meeting could do the same. Information should be sent to either Ian or Alan who will discuss and draw up a proposal.

It is possible that a future meeting could be at a test tank facility, perhaps the HOTA one in Hull, to enable people to see the performance of CWBA in the water and then decide on the items that should be tried by fishermen. However, this is not a firm commitment at this stage.

Pat Bonner proposed that only those items being displayed at the exhibition and currently being sold to fishermen should be included in the trials. Those manufacturers at the exhibition had shown commitment to fishing by being here.

Alan Dean thought that this would rule out some known good products from manufacturers such as ASPLI and Remploy.

Ian Benham summed up the meeting by stating that the next step is to draw up a list of products and for Seafish and RNLI to draw up a proposal. Ian explained that we also wished to consider the MOB scenario but we would have to discuss that in the future.

Comment

From the preceding notes it is evident that clear and precise details of a trials programme were not achieved by the meeting. However, the comments and viewpoints that were expressed are valuable in the task of deciding how to proceed. Unquestionably all were agreed that there is a need to try to improve the awareness of fishermen about CWBA and to identify products that can be recommended to fishermen. Perhaps, new products will eventually be developed.

Everyone was willing to participate with fishermen in their local area and it would be very good if we were able to instigate a lot of trial groups to assess and promote buoyancy devices in all areas. Budget limitations will no doubt preclude this but perhaps with FIFG grant funding it could be considered. It may be that just two or three groups can be set up and these are used to assess an extensive range of products or, we simply conduct efficient, cost-effective trials with selected items. Perhaps we should equip a van with a whole range of products and tour the UK with a ‘road show’ letting fishermen see what is available and as was suggested, provide a subsidy for them to purchase their preferred product in return for comments of their experience on a questionnaire.

RNLI and Seafish will be considering the options over the next few weeks and will draw up a proposal in the light of available budgets and in consultation with others.

Appendix III

Project Proposal September 2003

Acceptability Trials: Lifejacket and Buoyancy Devices

Objects:

- To undertake large-scale acceptability trials with a wide range of participants to assess the suitability of currently available lifejackets and buoyancy devices for use by fishermen when working on deck.
- To identify the good and bad features of products and to assess their 'in water' lifesaving capabilities when worn with normal 'sea gear'.
- To report and publicise the findings in order to promote the use of lifejackets/buoyancy aids and to assist purchasers to select the most suitable products.
- To provide information to manufacturers that will assist them to develop better products.

Background

Recent health and safety legislation has prompted many vessel operators to provide personal buoyancy devices for their crews and fishermen are now much more receptive to the wearing of lifejackets when working on deck. Unfortunately, fishermen who have accepted the regular wearing lifejackets and buoyancy devices are finding that the products are not ideal for their needs and often rapidly become damaged and worn. Although there are various makes of lifejackets/buoyancy devices available, the fisherman or vessel owner purchasing a lifejacket will find little choice in the local chandlers and quite often no informed guidance. Standards exist for the specification of lifejackets, the materials, construction and 'in water' performance but information on which lifejacket is comfortable to wear, will resist 'wear and tear' the best and that can be easily cleaned of fish guts, mud and grease is not readily available. Furthermore, how will the lifejacket perform 'in water' when the wearer is dressed in oilskins and Wellington boots, will it still turn the casualty face upward with adequate 'freeboard' for the mouth?

There is a need to test current products in real fishing conditions, winter and summer and with all the different fishing methods in order to identify those that are suitable for prolonged use by fishermen. It is likely that no single product will be ideal but the trials will identify the strengths and weaknesses of each product and enable fishermen to make an educated choice. A lifejacket/buoyancy device is only effective when it is being worn and although crewmembers are now being provided with lifejackets, very few are being regularly worn.

Financial Appraisal

Each year 20-30 UK fishermen die due to incidents that occur in the course of fishing. Incidents such as men being knocked, dragged or simply falling overboard and incidents where vessels collide, capsize, run aground or founder. In many cases fishermen needlessly drown and yet, had a lifejacket or buoyancy device been worn, their lives could have been saved.

An effective lifejacket or buoyancy device costs under £100 and has the potential to save the many hundreds of thousands of pounds that it is calculated that each life lost can cost. Aside from search and rescue costs, inquiry costs, maintenance for dependants etc there is an in-estimable cost in ‘human terms’. For fishermen to be able to consistently wear a lifejacket it must be suitable and ‘fit for purpose’. This proposal, to undertake acceptability trials, is greatly needed to identify suitable products and to promote their widespread use.

Experience

Seafish is a lead body in fishing safety and works closely with the Maritime and Coastguard Agency to address safety concerns. Seafish provides the statutory safety training and has developed the recently introduced Safety Awareness course that promotes strongly lifejackets and buoyancy aids. The proposed acceptability trials will compliment the training courses and Seafish with RNLI are two independent organisations, without commercial interests, who are ideally placed to organise and monitor trials for the benefit of all fishermen. RNLI are the marine rescue organisation for the UK and view the acceptability trials as essential preventative work to improve marine safety.

Proposal

Trials: RNLI have two Fishing Safety Co-ordinators for the Southwest and for Scotland. It is proposed that these two Co-ordinators will contact selected fishermen in their area and ask them to assess the various products. In addition, it is envisaged that once the more suitable products have been identified, group trials may be conducted in specific areas to subject products to more intensive assessment.

Products: All products that appear to be suitable for use by fishermen will be included in the trial. Although some manufacturers would willingly donate products for evaluation, in order to be free of any obligations and to include all possible items, the products will be purchased through normal retail channels.

Initial Tests: All items will be tank tested to ensure that they do give an acceptable level of buoyancy when the wearer is dressed in 'sea gear'.

Short Term Trials: The Co-ordinators will each hold a selection of products and fishermen will be given the opportunity to try several products for a short period, perhaps a week, to enable them to decide on a preferred product for long term trials.

Long Term Trials: The fisherman will select one or two products, for winter and summer and will be equipped with these for long term use in the normal course of fishing over a twelve month period. It is intended that several fishermen will be testing each of the preferred products to achieve a balanced view.

Monitoring: The Co-ordinator is to maintain regular contact with the fishermen to ensure that the item is being worn and record any comments and problems.

Assessments: A final tank test will be conducted on each product to ascertain if it still has adequate lifesaving capabilities.

Reporting: A report will be produced describing the trials in detail and the results obtained. In addition, a data sheet will be produced giving guidance on the selection of lifejackets and buoyancy devices. Both of these will be publicised widely.

Duration: The project will take approximately two years to complete, from the initial selection and tests of products, the short term trials, followed by long term trials and reporting.

Post Trials: Manufacturers will be able to use the information gained in the trials to design products that do meet the needs of fishing. The trials and subsequent publicity will promote and educate. The lifejackets and buoyancy devices purchased for use in the trials will be utilized by RNLI on road shows etc. to promote safety.

Anticipated Costs

Initial purchase of products for assessment (1st set)	£4000
Test Tank hire (twice)	£1000
2nd set of products for short term trials	£4000
Preferred products for long term trials, Say, 100 fishermen at an average product cost of £120 each £12000	
Meetings for briefing and assessment: venue costs, travel and subsistence expenses for invited fishermen	£3000
Miscellaneous costs: servicing, cleaning etc.	£2000
Contingency for possible group trials if considered desirable	£6000
Staff costs:	
RNLI Fishing Safety Co-ordinator Scotland 5 man days per month over 18 months = 90 man days	£5200
RNLI Fishing Safety Co-ordinator Southwest 5 man days per month over 18 months = 90 man days	£5200
RNLI Water Safety Manager Meetings, promotion, management etc: 15 man days	£1500
Seafish, Safety Engineer, Meetings, promotion, management, reporting: 40 man days	£6900
Total	**£50,800**

List of Products

Inflatable lifejackets

		Est. cost
ASPLI	A36 H (150N) with PVC cover	£80
ASPLI	Secumar BS100 ALPHA	£75
ASPLI	Secumar BS150 ALPHA	£80
ASPLI	Secumar BS 100 auto	£75
ASPLI	Secumar BS 150 auto	£80
Challenger Worksafe 150 N auto		£75
Crewsaver	Crewfit 150N std.auto	£80
Crewsaver	Crewfit 150N Ham auto zip	£85
Crewsaver	Crewfit 275N Ham auto zip	£105
Crewsaver	Voyager 150N auto	£85
Crewsaver	Voyager 275N auto	£105
Crewsaver	Elite Std. Auto MCA/UK SOLAS	£180
Crewsaver	Harvester auto	£120
Crewsaver	Bodywarmer lifejacket 150N auto (if available)	£120
Lalizas	Omega auto 150N with harness	£48
Lalizas	Sigma CE 150N auto with harness	£40
Mullion	Neptune 150 CE with harness	£85
Mullion	ECO 150 CE with harness	£70
Mullion	Mariner 275 CE with harness	£105
Mullion	Seefloat 150 N auto standard	£110
Mullion	Seefloat 275 N auto standard	£115
Remploy	Commodore auto (174N)	£80
Remploy	Kestrel auto (160N)	£75
Remploy	Compact 150	£150
Viking	RescYou Mariner auto	£80
Viking	RescYou Conquest auto	£90
	Total	**£2313**

Buoyancy Devices/Oilskins with buoyancy

		Est. cost
ASPLI	A50 buoyancy vest 80N	£50
Crewsaver	50N Industrial buoyancy aid	£50
Guy Cotten	Secubib Lifejacket/braces	£150
Guy Cotten	3-D top (can be worn over a lifejacket)	£50
Guy Cotten	Seafish bib & braces	£120
Guy Cotten	Flotation waistcoat	£60
Grundens	Stormy Seas 400 jacket	£80
Mullion	Workvest 100N	£60
Mullion	Lobster suit 80N thermal buoyant suit	£170
Mullion	Aquafloat Supreme 50N thermal buoyant suit	£150
Viking	Worksuit with lifejacket 165N auto	£175
Viking	Elka oilskin top with 165N auto lifejacket	£140
	Total	**£1255**

Appendix IV

Questionnaire

RNLI/SEAFISH LIFEJACKET & BUOYANCY AID TANK TEST

PRODUCT NO	**PRODUCT NAME**				
COMFORT	**VERY UNCOMFORTABLE**				**VERY UNCOMFORTABLE**
Ease of donning	1	2	3	4	5
Comfort when wearing	1	2	3	4	5
Comfort when working	1	2	3	4	5
POTENTIAL PROBLEMS WHEN WORKING	**POTENTIAL HAZARD/PROBLEM**	e.g. snag points, ease of cleaning			**MINOR PROBLEM**
.....	1	2	3	4	5
.....	1	2	3	4	5
.....	1	2	3	4	5
.....	1	2	3	4	5
Did the lifejacket/BA operate effectively ***(please circle)*** **If NO, comments:-**	**VERY UNCOMFORTABLE**	**Y**		**N**	**VERY UNCOMFORTABLE**
Comfort when in the water	1	2	3	4	5
Would you wear this product when working? *(please circle)* **If NO, comments:-**			**Y**		**N**
COST £	**Would you buy this product?**		**Y**		**N**

OTHER COMMENTS NOT COVERED BY ABOVE:-

Appendix V

Procedure for Test Tank Trials

Procedure for Test Tank Trials

Persons attending

RNLI	Ian Benham David Smith Simon Armstrong
Trainers	Len Jenson Gary Mckie Lachie Paterson
Fishermen	4 with Simon 4 with David 1 with Lachie 1 with Gary Jason Rudd Alan Piggott
Seafish	Kevin Franklin Alan Dean Tony Tait? (Possible help to deflate and sort out the lifejackets)
Classlane	2 Film crew

Products to be assessed

25 Inflatable lifejackets.
9 Buoyancy vests/waistcoats (3 of these are full 150N lifejackets.)
5 Buoyant thermal suits.
3 Oilskins with lifejackets built in.

We have two of each item, plus any other items that may be brought along.

There are 12 sets of oilskins and boots to be worn by the testers.

Testers

It is assumed that the fishermen, 12 in total, including Alan Piggott, will be willing to do the in water testing. Perhaps all 12 will volunteer but even if only 9 or 10 are willing that will be OK. With 12 testers it would be possible to assess items in batches of six, two testers wearing each item. However, it may prove more manageable with just three items at a time, six testers.

We may have to face the possibility that the water may be quite cold and it will be necessary for others to take a turn in the water. Thus we will need to be flexible.

Recording of Assessments

A questionnaire has been prepared to enter opinions and observations on. This has a 1to 5 scoring system to enable the data to be analysed.

It is the opinions of the fishermen that are paramount but many of the others attending are experienced fishermen and their views will contribute.

Because only the two fishermen wearing and testing a particular product will have direct experience of it, in order to widen the assessment and allow the other fishermen who are testing other products, to express their views on every product, it is proposed to work in teams. The team leader will record the opinions and observations of the group members.

Three teams will be formed each consisting of 4 fishermen and one trainer. Ian, David and Simon will head the teams. The persons acting as testers can be rotated as each team wishes, thus everyone can have a turn, which may be essential if the water is cold.

Conduct of trials

The three teams with the testers, dressed in oilskins and boots, are to gather where everyone can observe the trials.

Stage 1 Wearing

Two testers, wearing oilskins, one with oilskin top and one without, from the first team will put on the two examples of the 1st product. All persons from all teams will observe and the two testers will verbally give their comments on how comfortable the item is. The testers will then attempt to see how restrictive the item would be when working and again give their views to everyone. Each team can discuss and consider the pros and cons of the product and record their comments on the assessment forms.

Two testers from the next team will then don the two examples of the 2nd product and repeat the assessment with all persons observing. Similarly, the 3rd team will have its testers put on and assess the 3rd product.

The important factor is that all teams observe every product and record their views.

Stage 2 Still Water

The two testers from the 1st team enter the water, first one then the other, to give time for the observation of the inflation of each product. All persons from all teams are to observe and record.

The testers will be asked how comfortable the product is and asked to simulate being unconscious. All will observe how well the product keeps the wearer's mouth clear of the water. The testers will then try swimming to see how easy this

is. The testers will then climb out of the water to be able to observe the next products.

The 2nd team testers enter the water, one at a time, all persons observing and the testers give their views on comfort and repeat the unconscious simulation and swimming exercise. Similarly, the 3rd team testers will follow.

The teams enter their views on all the products on the assessment sheets.

Stage 3 Waves

All six testers from the three teams enter the water and the waves are started. A short period will be required for the waves to build up, thereafter, everyone is to observe all the products to see how well they support the wearer and how much splashing reaches the mouth.

The waves will be stopped and all testers leave the water. Team observations of the performance of all products are to be recorded.

Stage 4 Final Assessment

Each tester will be asked to check if the belt is still secure and for their views on the product.

They will be asked, ‘would you wear it?’ yes or no.
They will be told the price and asked, ’would you buy it?’

The teams will consider and record their views on all the products, including those tested by the other teams.

Film crew

The filming is secondary to the assessment work and whilst every effort will be made to facilitate the film crew’s requirements there will not be time to do prolonged interviews to camera; perhaps, a brief reaction from each tester as they come out of the tank.

It is suggested that the film crew endeavour to record the product being worn out of the water and then shots of it inflating and ‘in water’ performance. A narrators voice added afterwards will no doubt be better than the echo of noise and conversation in the tank building.

Photographs

A digital picture of each product is required for reports etc and Kevin will be asked to take photographs of the testers wearing the item and then in water. Glare from the reflective strips often spoils flash photography but good images should be achieved of the un-inflated lifejackets.

Organisation

Alan and Tony will organise the products to be tested. They will issue the items to the testers and announce what the product is, with a brief description. They will assist by adjusting straps as required to ensure that it fits the tester correctly. Once ‘set up’ the tester can re-don the product to see how easy this is.

After the tank test, they will assist the testers to remove the lifejackets and will deflate them.

Safety

All persons will comply with the instructions of the Offshore Survival Centre staff. It is likely that everyone will be asked to wear a lifejacket when near the edge of the tank.

Those that are carrying out the testing do need to be aware that inflatable lifejackets are not totally reliable and may not inflate correctly. Some lifejackets on inflation can be very tight around the neck and throat resulting in the wearer feeling that they are not going to be able to breath. In this scenario, they should use the manual inflator tube to release some of the pressure in the lifejacket.

If anyone is in difficulties they should wave and shout for help immediately. The Survival Centre staff will give assistance. Those not in the water should constantly be looking to make sure that everyone in the water is safe and draw attention immediately if there is even the least concern.