

# Squid Trawl Fleet Sea Lion Escape Device Audit

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A REPORT COMMISSIONED BY  
DEPARTMENT OF CONSERVATION

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OCTOBER 2007



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# Methods

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## Objective

This review was undertaken to meet the requirements of the contract with DoC (Project # MIT 2004/05) i.e. review devices aiming to mitigate interactions between the New Zealand sea lion and the southern squid trawl fishery. It was a Conservation Service funded via levies from the commercial fishing industry.

## Key Actions

Key actions were:

- Ascertain nature and extent of the audit and agree criteria. This was undertaken by meeting with and including MFish (Rob Mattlin), netsheds (Motueka Nets Ltd and Hampidjan NZ Ltd), experts (M. Cawthorn, R Wells) and project managers. Any relevant issues arising from this were passed by the SLED WG prior to their application in the audit process.
  - Only 2 auditors were chosen (the netsheds named above) as the increased technical nature of the audits was considered beyond the ability of some of those selected last year.
  - Two audit sheets were produced, the Compliance Specification that is used to allow the MFish Operational Plan (OP) discount factor (attached Appendix 1), and the more technically detailed DWG "Health Check" (attached Appendix 2). While making the process more complex, this route was chosen to ensure that not only were SLEDs compliant to existing SLED WG agreed specification as required for the MFish OP but to further check on particular construction detail where it was agreed that this was important to SLED performance. Put simply this was to take a major step up in the overall examination and standardisation of SLED construction.
  - At the start of the actual audit process and again during it, the actual individuals undertaking the audits were brought together to ensure calibration, i.e. that congruent interpretation of the specification sheets and process was occurring to ensure standardisation.
  - All operators known to have SLEDs were contacted by e-mail and provided with specifications and check sheets as well as explanatory notes on the process (as shown in Appendix 3).
  - SLEDs were delivered to the operational bases of the netsheds undertaking the audits and total number of SLEDs was split roughly 50:50 between them based on logistical efficiency. Thus all were audited at either Motueka Nets or Hampidjan.
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# Results

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## General

A total of 60 SLEDs (attached Appendix 4) were audited (compared to 63 the previous year). Note that some vessels from last year are no longer fishing. A very few SLEDs that have not been used for some years and are not planned to be used next season were not checked. The owners of these understand the need to have a compliance certificate for them in the unlikely event that they want to fish this season.

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## OP Compliance Check

This check as per the specification used last year and in use for the coming season (Appendix 1) showed 38% failures. The most common causes of OP Compliance check failures :

- Kites not rigid enough (due to re-definition of semi-rigid) 16/23 failures
- Very minor grid bar spacing failures of a few millimetres, generally in the gap between outer frame and first bar (wear and damage) 3/23 failures
- Grid angle (more focus on measure) 2/23 failures
- Non-continuous stitching around grid perimeter (wear) 2/23 failures

These failures were generally minor in extent (except for kites where the new, narrower definition of rigidity necessitated the replacement of canvas and vinyl kites) and can be attributed to wear and tear since last measured or the clearer focus, rigor, standardisation of process and technical expertise brought to bear on this OP Compliance check. Note that full clarification of particular SLED issues such as kite rigidity and attachment of hood to grid also contributed to increased failures in regard OP compliance.

Note that during the 2006/07 Fishing Year squid season nearly 90 individual checks of SLEDs were carried out by MFish Scientific Observers and Fisheries Officers.

All failures were rectified at the owner's expense such that all SLEDs inspected were issued with a Compliance certificate which has been forwarded to MFish prior to 2008 squid season (Appendix 4).

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## Health Check

Health check failures (61%) where the OP specification was met but further desirable agreed attributes (now in proposed 2008/09 specification and shown in Appendix 2) were missing. These were generally attributable to:

- Kite, hood and escape hole conformation (size and shape)
- Kite size
- Lack of floats on kite

All these issues were rectified at the owners expense such that now all SLEDs are to the same standard.

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**Modifications** In regard the modifications to SLEDs (13% were noted) these were chiefly:

- From one sector of the fleet and involved a “deflector panel” of netting inside the lengthener to direct catch and water-flow towards the bottom of the grid. This is common practice on separator grids in the northern hemisphere to reduce escapement of the target species. The efficacy of this is not understood for squid/sea lion separation
- Floats attached inside the SLED in front of the grid

All modifications were removed or set to specification (Appendix 1 & 2) standards.

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# Discussion

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## Process

The project took longer to carry out than planned and described in the contract due to the logistics of retrieving all SLEDs (many were stored on vessels at sea) and the effort put in to ensuring agreement on the content of the checksheets and congruence between the auditors. This extra time and care paid dividends in assuring total standardisation in the process.

There was very good support from both the fleet operators and auditing netsheds; communication was open and constant.

The co-ordinating and management role undertaken by C&A was essential.

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## Non-Compliance

The level of non-compliance to the OP Compliance check is not considered to be a major issue. Generally it was due to fine level detail or the result of calibration on particular issues around kite rigidity (which was agreed between the auditors prior to the process), and a result of wear and tear from the previous season.

It is important to understand that the past focus on SLED performance and SLED audits has been the grid. This separates sea lions from squid, it does not lead to the sea lion's escape from the net; this is the role of the escape hole/hood assembly (the escape department) which was the major focus of the DWG "health check".

As past failures of the grid have been apparent through animals passing through into the codend, this focus was justified. However, the increased level of focus this year to the escape department makes it unsurprising that some detail compliance failures have arisen.

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## "Health Check"

This is the area where DWG was looking to standardise the salient points of the earliest and best detailed technical "builders" specification for SLEDs. Generally it relates to the net plan component of the SLED as originally developed between SFMC, AMC and Motueka Nets Ltd.

By reconvening with those who undertook the original trials and design work at the AMC flume tank (Figure 1) and also including both current builder/suppliers of SLEDs and other experts we could produce a checksheet which the best knowledge in the country could agree covered those areas considered important to SLED performance.

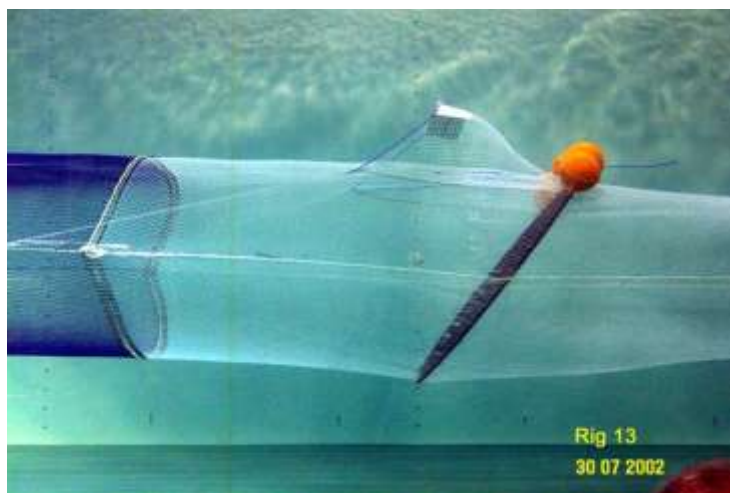


Figure 1: Rig 13 in the Australian Maritime College Flume Tank, 2002.

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## Discussion, Continued

### Modifications

Some of these were unexpected for the auditors and were most common in SLEDs that have been built by a vessel's crew.

The modifications in themselves were understandable, and based on improving the efficiency of the SLED rather than subverting its purpose.

Some of the modifications warrant further investigation to check their validity, however due to DWG's desire to get ALL SLEDs to a single, agreed standard based on previous best research, these modifications were removed in consultation with the SLED owners.

### Correlation to Underwater Video Footage

28 hours of underwater video footage taken by DWG during 2006/07 Squid season suggests kite/hood failure occurred on an intermittent basis (Figure 3, & 4).

We believe that the focus on both kite size and material, as well as requiring static flotation on kites to ensure correct deployment during shooting will solve this problem. The health check has ensured that this is now the case on all SLEDs.

It is very apparent from the footage that a properly constructed, sized and deployed hood works exactly as required and predicted by flume tank modelling (Figure 2). Note all the Figures 2-4 are of the same trawl.

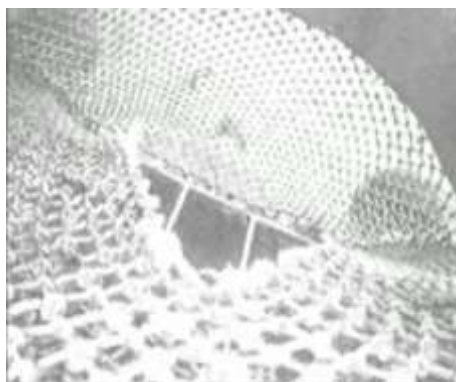


Figure 2: Hood correctly deployed and operating

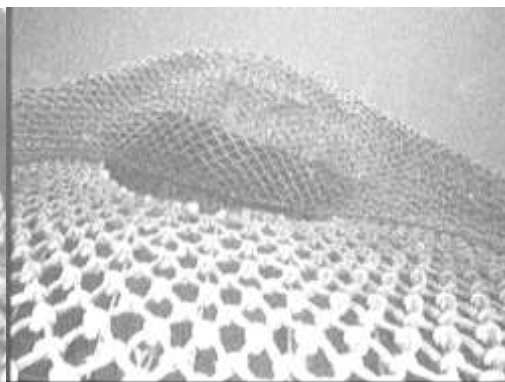


Figure 3: Collapsed hood, 2007 Season

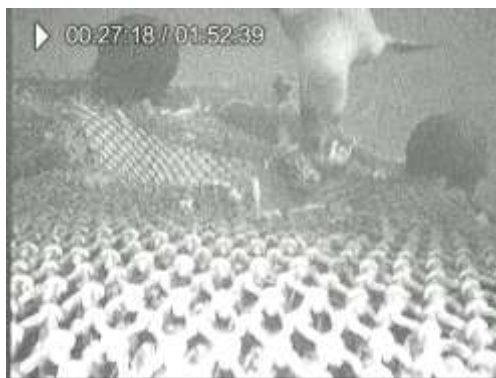


Figure 4: Sea lion inspects collapsed hood, 2007 Season

## Recommendations

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1. That the results of this review be disseminated to the squid fleet and MFish.

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  2. That the proposed draft specification sheet and checksheets (attached Appendix 5) be considered and approved by either the SLED WG or other agreed process.  
  
Note that it will be important to manage both the need to have a prescriptive level of technical detail in the specification such as to ensure best practice performance from the SLED while acknowledging that auditing to this level of specification may require skills that are currently beyond most MFish Fishery Officers or Scientific Observers.

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  3. That any future audits remain in the hands of the two netsheds who undertook this process, until agreed otherwise.

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  4. That the various modifications that have been discovered in this process be considered and those worthy of further research be investigated.

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  5. That all observers note and report the serial number of any SLED taking a sea lion and pay the utmost attention to the animals location in the trawl or SLED.

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# Appendix 1

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## SLED Specification October 2006

MK. 3/13 SLED Specification

For the use in the 2006/07 SQU 6T Fishing Season

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The SLED required for use by all vessels in the 6T squid fishery is an approved type that meets the following criteria:

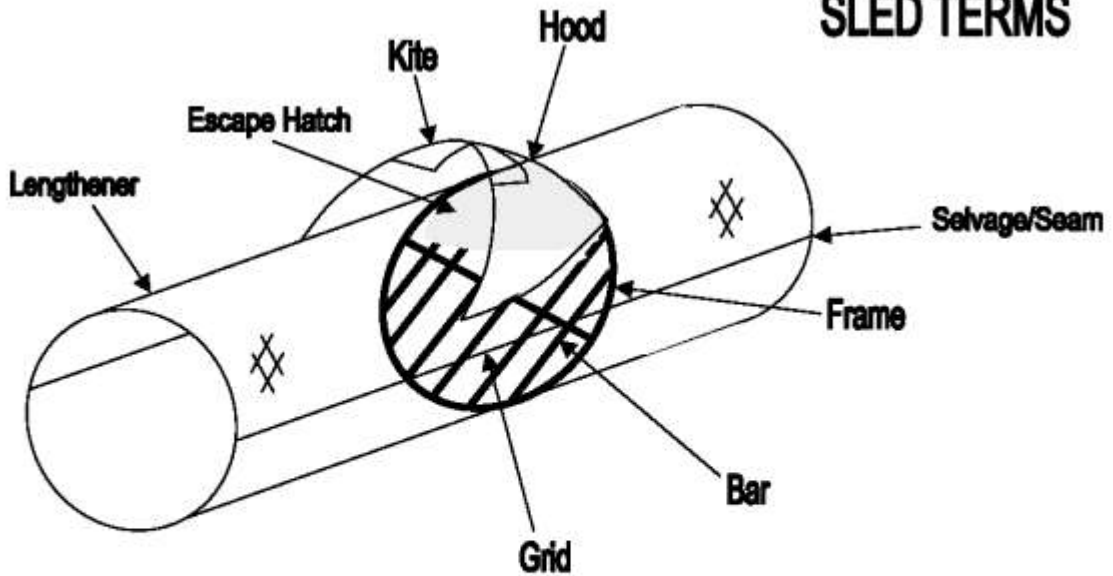
1. The SLED must consist of a lengthener section of net, with either 2 or 4 seams, containing a 2 (or 3) piece grid, hinged along the middle. The grid should be set in the net at about  $45^{\circ} \pm 5^{\circ}$  downstream from the vertical and continuously sewn to the net meshes around its circumference.
2. The grids must be constructed of **minimum 20mm stainless steel bar** and should be shaped to conform to the working parameters of the net.
3. Vertical **grid bars** must be **evenly spaced** at a **maximum distance of 23cm between bars** (see diagram). There will be no minimum number of bars, provided they are **evenly spaced** and do not exceed the recommended maximum spacing.
4. The Escape Hatch must be triangular and let into the upper surface of the lengthener section. The hatch must be a **minimum of 1metre wide at the base**, along the top bar of the grid. The apex of the triangle must be a **minimum of 1metre forward** (upstream) of the base (refer diagram).
5. Above the Escape Hatch, a hood-shaped mesh scoop must be attached with its open (leading) end facing into the water-flow and its closed (trailing) end attached one to three meshes behind the top bar of the grid. The leading edge of the Hood must be a **minimum of 80cm high** when fully extended.
6. The Hood must have a strip of semi-rigid material (Kite) under the meshes of the Hood. The leading edge of the Kite must be attached to the leading edge of the Hood. The leading corners of the Hood must extend forward of the Escape Hatch.
7. The SLED must be inserted into the trawl with the Escape Hatch on the upper surface when the net is fishing.
8. There are elements of the SLED configuration that may vary including, the presence or absence of floats attached to the grid or kite, the shape, width and height of the grid, the number of vertical bars in the grid, the number of meshes in the hood, the number and size of meshes in the lengthener section depending on the net in which the SLED is inserted.
9. Each SLED grid frame must have a unique registration number, identifying it as an approved unit, clearly stamped into the frame bar at each end of each hinge section. Each SLED registration number will be recorded by Deepwater Group Ltd. DWG's register of SLED numbers must be provided to MFish as required.
10. **Clarification:** For clarity please note that while the specification calls for bar spacings in the grid to be even, it may be necessary to have the last spacings between the final bar and the grid frame differing from the rest of the spacings. Provided they are **always LESS THAN 23cm** apart between bars and frame.

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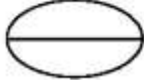
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## SLED TERMS



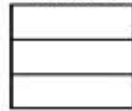
### 2 Section



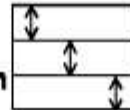
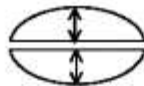
### Max Width



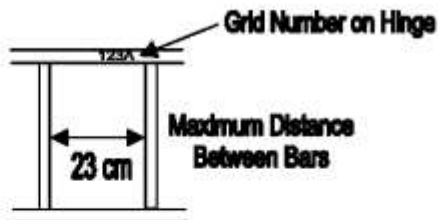
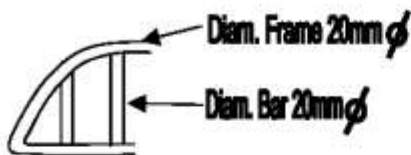
### 3 Section



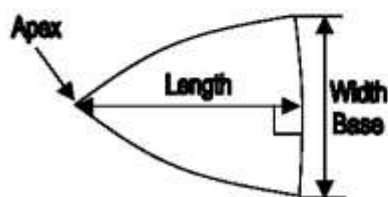
### Max Height of Each Section



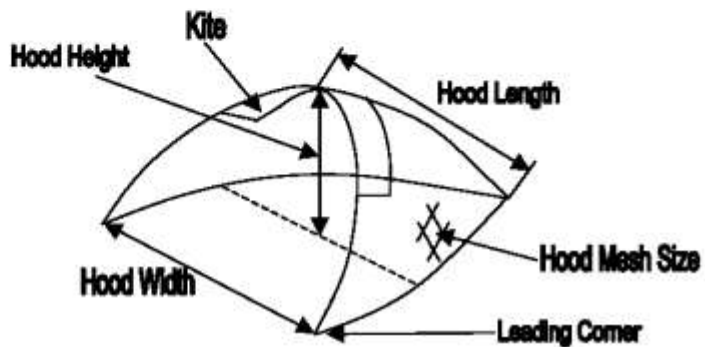
## GRID



### Escape Hatch



## ESCAPE HATCH



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# Appendix 1, Continued

## Deepwater Group Ltd SLED Check Sheet – Oct 2006

(Modified from the Mfish Checksheet)

### SLED Measurements Form

Refer to 'MK. 3/13 SLED Specification'

Document version: 02 October 2006

Reason for completing form – DWG Audit

Vessel Operator

Auditor	Name	Signature
Company Manager		
Audit Company		

Date measured

Day	Month	Year

Grid ID No.	Photo ID Sent	Vessel Name

Net Type	
Midwater	
Bottom	
2 seam	
4 seam	

Grid (min size 20 mm)	
Frame steel diameter (mm)	
Bar steel diameter (mm)	

Vessel Callsign

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Grid Type	
2 section	
3 section	
Other *	

Grid shape	
Oval	
Oblong	
Square	

Net Gear code

Grid width	Section 1
max (cm)	

\* Provide information in comments box.

Grid height	Section 1	Section 2	Section 3
max (cm)			

\*\* Note: Section one starts next to escape hatch

Grid bar spacing (Section 1)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
(between bars) (cm)												
Grid bar spacing (Section 2)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
(between bars) (cm)												
Grid bar spacing (section 3)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
(between bars) (cm)												

Escape Hatch	
Width at base (cm)	
Length - centre of base to apex (cm)	

Hood Dimensions	
Width (cm)	
Height (cm)	
Length (cm)	

Mesh size	
Hood (cm)	
Lengthener (cm)	
Measure inside of knot to inside of knot - net stretched	

**Comments:**





## Appendix 2

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Deepwater Group Limited

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### 2007 SLED Certification and “Health” Check

07/08/07

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#### SLED components to be checked in addition to Operational Plan Compliance Certificate:

##### 1. Kite Flotation

The kite on the hood must have a single float attached. This should be not less than 200mm and 2.5kg buoyancy (lift) and standard should be 240mm at 3-3.5kg lift.

**Rationale:** The kite requires this lift to ensure it deploys properly during shooting. Video footage has shown kites without floats deploying downwards and effectively blocking the escape hole.

Attachment of the float should be as follows:

- In centre of kite length (top of hood) and on leading edge
- Securely and closely lashed to leading edge such that it cannot roll under leading edge of kite during deployment

##### 2. Kites

These are to be made of standardised material and size.

**Material:** Semi-rigid conveyor belting (pvc covered cloth web) as used on factory conveyors. Tarpaulin, canvas or vinyl will not suffice. Belting must be a minimum of 3mm and maximum 8mm thickness.

**Size:** Kite dimensions must be 2.2m long by 0.325m deep (wide)

**Rationale:** Extensive flume tank tests on a ½ scale model showed that this semi-rigid material to this size provided optimum lift for the hood. Soft materials did not work.

**Attachment:** Kites to be securely attached to each mesh at leading edge, and securely to trailing edge.

**Rationale:** Kites need to be stable; loose or crumpled kites may react downwards and close the escape hole.

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## Appendix 2, Continued

### 3. Escape Hole Dimensions

These must meet the Operational Plan Specification. Hole size should be determined by number of meshes (bar lengths) removed.

Table 1 gives information on number of meshes for different mesh sizes to ensure correct size hole.

**Rationale:** This size hole has been determined by experts as suitable to release sea lions. Variations in hole size mean that standardisation and checking becomes more difficult.

Hood netting dimensions						Hole Depth
Netting centre knot mm	Depth Mesh	bottom width Mesh	Top width Mesh	edge mesh past kite	mesh per hole	mesh deep
70	34	39	105	14	8.5	24
80	30	34	92	12	7.5	21
90	27	30	82	11	6.5	18.5
100	24	28	74	10	6	17
110	22	25	67	9	5.5	15.5
120	20	23	61	8	5	14

**Table 1:** Hole size and hood dimensions by (number of meshes for various mesh sizes).

### 4. Hood

The hood dimensions should be the same for any size SLED.

**Material:** Should be constructed from netting not less than 60mm inside mesh and not greater than 120mm. The use of 70mm centre of knot netting is recommended if available but not essential. Table 1 gives number of meshes for various mesh sizes to ensure correct size hood.

**Note:** Operators must be aware of Regulations regarding mesh size, especially the use of 60mm inside mesh.

**Rationale:** The hood is designed to both prove sea lions are capable of swimming out of the trawl and prevent squid escaping. Non escape of squid is due to water flow into the trawl via the escape hole, directly onto the grid face being increased by the hood. Smaller mesh (60mm) will enhance this effect. It is also probable that this flow of water will help lead sea lions to the escape hole.

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## Appendix 2, Continued

### Hood Attachment:

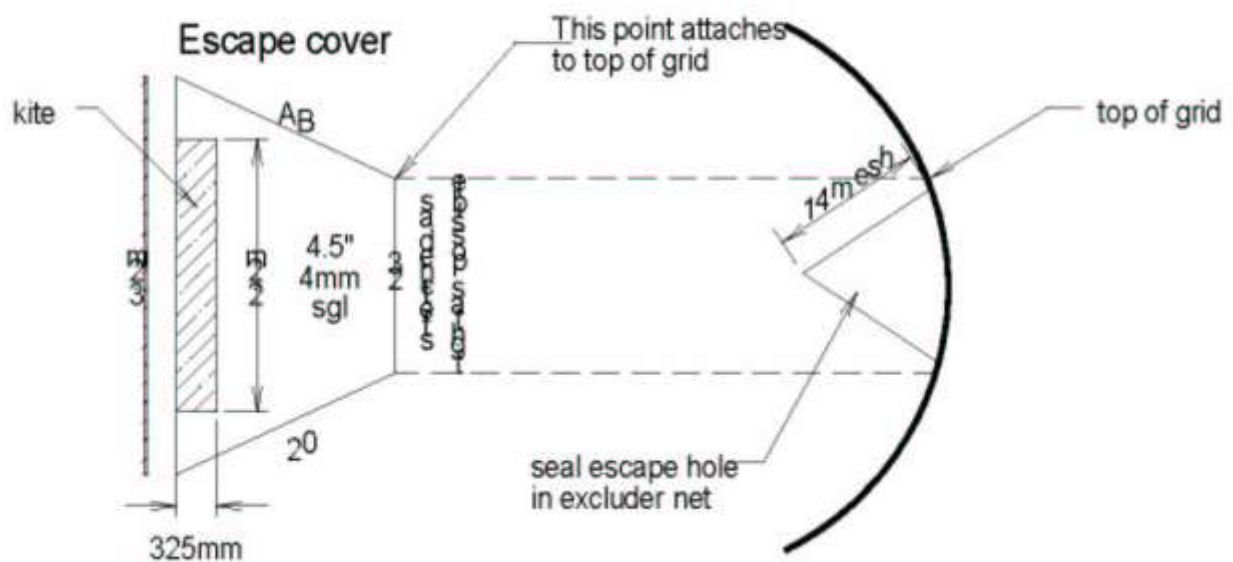
- Leading edge – the hood must be attached to a rope of 3.2m length (see diagram) this ensures that full extension of the hood upwards when deployed
- Trailing edge – meshes attached at the trailing edge of the hood must be stretched as far as possible across the width of the SLED and attached directly to the top bar of the SLED. This ensures that no slack netting is in this area.

### Rationale:

The hood is acting like a miniature net in itself. The leading edge requires slack netting to allow it to rise up on deployment. The trailing edge of the hood needs to remain tight with no excess netting which can form a pocket to hold fish and effect the performance of the hood overall by dragging down the leading edge.

### Overall hood, kite and escape hole assemblies:

- Provided below are Figures 1 & 2 detailing overall measurements. This is based on 4 ½ inch mesh size. As per the Table 1 above, number of meshes will differ for differing mesh sizes.

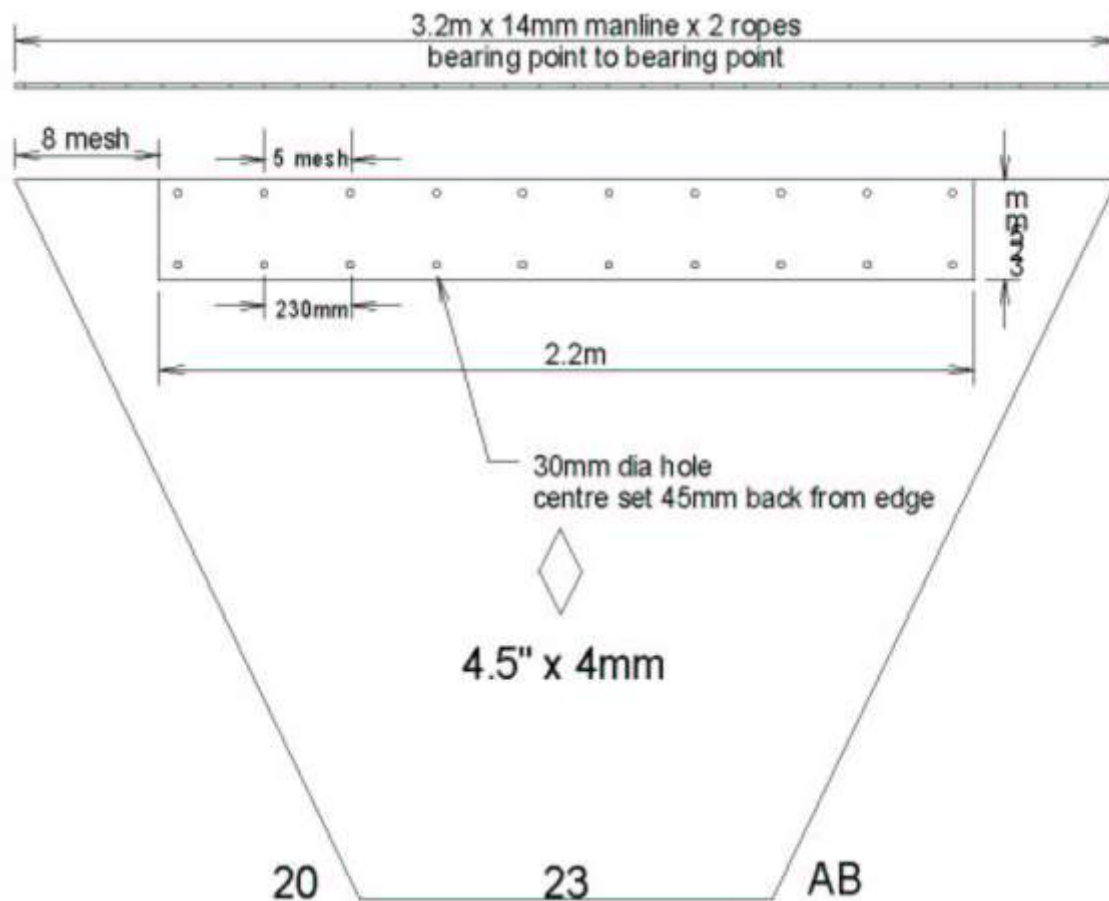


**Figure 1:** SLED escape assembly

Continued on next page



## Appendix 2, Continued



**Figure 2:** Hood and kite plan. Note that the 2 x 3.2 metre manline ropes are both threaded through the leading edge holes on kite (alternate holes).

Regards,

Richard Wells  
Squid Fishery Manager

## Appendix 3

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Deepwater Group Limited

Nelson Office

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# MEMO

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**To:** Squid Operators

**From:** Richard Wells, Squid Fishery Manager  
Deepwater Group Ltd

**Date:** 7 August 2007

**Subject:** **FURTHER INFORMATION ON SLED CHECKS THIS YEAR**

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Dear Operator,

On 18 July, DWG sent out to all known operators in the SQU6T fishing area, a notice about SLEDs and an upcoming audit and "health check" process.

Since that time there has been more consultation and on 6<sup>th</sup> August a significant meeting was held, attended by MFish, DWG, Martin Cawthorn and staff from Motueka Nets Ltd and Hampidjan NZ Ltd.

This was a very constructive meeting in all regards and this memo is to update you on what process will occur going forward.

As previously noted your SLEDs will be audited for compliance to the MFish Operational Plan requirements as per last year with only 2 minor changes:

1. The checksheet/certificate will be modified slightly
2. Based on yesterdays meeting, there will be a requirement that the trailing edge of the hood be attached to the SLED top bar, not 1-3 meshes behind it. (This change agreed by the SLED WG and MFish)

So:

Your compliance certificate will be produced (to get you the discount factor) based on the Oct 2006 MK 3/13 specification, with the only change being attachment of the hood trailing edge to the SLED top bar. This will be free of charge to the operator.

A "heath check" of the other key components will be carried out as per the attached information sheet. This is because while the Grid separates the sealion from the squid and prevents it from entering the codend, the hood assembly and escape hole allow the animal to escape. These specifications have been agreed by both Motueka Nets and Hampidjan as meeting the best available information on SLED design and performance.

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## Appendix 3, Continued

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It is highly desirable for the coming season to have your SLEDs meet these added standards, as they were developed in a scientific and practical way by net makers. It is expected that some or all of these will become requirements for the following 08/09 Fishing Year Operational Plan following consultation with MFish and the SLED WG. This year gives us the opportunity to identify any issues and get everybody up to speed.

This "health check" will also be at no cost to the operator. Any work carried out to reach these standards will be at your cost.

We are aiming to have all SLEDs certified and "health checked" by 30 September 2007.

Both Hampidjan NZ and Motueka Nets will be available to carry out these checks and can answer any queries on SLEDs from a technical perspective.

Their staff nominated for this are:

- Carolyn Collier and Herb Williams – Hampidjan
- Owen Hoggard and Glen Curtis – Motueka Nets

DWG have advised both Fisheries Audit Services and Gourock that they will not be certifying SLEDs this year.

We require each operator to advise their preferred auditor and in which port their SLEDs are (or will be available). This needs to occur as soon as possible to reduce logistical complexity. All responses should be to John Cleal (021 305 825 or [john.fvms@xtra.co.nz](mailto:john.fvms@xtra.co.nz)) who will oversee the co-ordination of this process between operators and netsheds. Once the schedule is agreed, operators should confer with the netsheds on all technical issues.

He will then, in consultation with you, organise for the most efficient operational plan to ensure completion. We are looking for operators have all their SLEDs in one of 3 ports at one time as per our previous memo.

Regards,

Richard Wells

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## Appendix 4

### Vessel VMP/SLED Information and ID Sheet

Operator	Vessel name	SLED A - B	Date of Audit	Audit by Hamp/ Mot Net	SLED ID #	MFish Checksht	Photo ID Received Yes/No	SLED Passed Yes/No	
Sanford	San Waitaki	SLED A							
		SLED B	12/10/2007	Hamp	SW2	Y	Y	Y	
	San Discovery	SLED A	11/10/2007	Hamp	SD1	Y	Y	Y	
		SLED B	11/10/2007	Hamp	SD2	Y	Y	Y	
	San Enterprise	SLED A	10/10/2007	Hamp	SE1	Y	Y	Y	
		SLED B	9/10/2007	Hamp	SE2	Y	Y	Y	
	Dong Wong 519	SLED A	25/10/2007	Hamp	DW1 519	Y	Y	Y	
		SLED B	24/10/2007	Hamp	DW2 226	Y	Y	Y	
	Dong Wong 701	SLED A	25/10/2007	Hamp	DW1 701	Y	Y	Y	
		SLED B	25/10/2007	Hamp	DW2 701	Y	Y	Y	
	Dong Wong 522	SLED A	26/10/2007	Hamp	DW1 522	Y	Y	Y	
		SLED B	26/10/2007	Hamp	DW2 522	Y	Y	Y	
	Sealord	Rehua	SLED A	19/09/2007	Mot nets	REH1	Y	Y	Y
			SLED B	19/09/2007	Mot nets	REH2	Y	Y	Y
SLED C			19/09/2007	Mot nets	REH3	Y	Y	Y	
Paerangi		SLED A	18/09/2007	Mot nets	PAE1	Y	Y	Y	
		SLED B	18/09/2007	Mot nets	PAE2	Y	Y	Y	
		SLED C	18/09/2007	Mot nets	PAE3	Y	Y	Y	
		SLED D	18/09/2007	Mot nets	PAE4	Y	Y	Y	
A. Buryachenko		SLED A	17/09/2007	Mot nets	BUR01	Y	Y	Y	
		SLED B	17/09/2007	Mot nets	BUR02	Y	Y	Y	
Prof. M. Aleksandrov		SLED A	17/09/2007	Mot nets	PRO1	Y	Y	Y	
		SLED B	17/09/2007	Mot nets	PRO2	Y	Y	Y	
Meridian 1		SLED A	17/09/2007	Mot nets	MER01	Y	Y	Y	
		SLED B	17/09/2007	Mot nets	MER02	Y	Y	Y	
		SLED C	17/09/2007	Mot nets	MER03	Y	Y	Y	
A. Columbia	A. Columbia	SLED A	24/09/2007	Mot nets	T20064	Y	Y	Y	
		SLED B	24/09/2007	Mot nets	T20063	Y	Y	Y	
	A. Enterprise	SLED A	24/09/2007	Mot nets	T20062	Y	Y	Y	
	A. Explorer	SLED A	24/09/2007	Mot nets	T20066	Y	Y	Y	
SLED B									
Northland Deepwater	Pantas 1	SLED A	18/10/2007	Hamp	MO6	Y	Y	Y	
Southern Storm	Oyang 96	SLED A	11/09/2007	Hamp	OY 96/1	Y	Y	Y	
		SLED B	16/10/2007	Hamp	OY 96 11	Y	Y	Y	
	Oyang 70	SLED A	16/10/2007	Hamp	OY 70/1	Y	Y	Y	
		SLED B	16/10/2007	Hamp	OY 70/2	Y	Y	Y	
	Oyang 77	SLED A	18/10/2007	Hamp	OY 77/1	Y	Y	Y	
		SLED B	18/10/2007	Hamp	OY 77/2	Y	Y	Y	

Continued on next page



## Appendix 4, Continued

Operator	Vessel name	SLED A - B	Date of Audit	Audit by Hamp/ Mot Net	SLED ID #	MFish Checksht	Photo ID Received Yes/No	SLED Passed Yes/No
Independent	Mainstream	SLED A		Mot nets	2-62914	Y	N	Y
		SLED B	4/10/2007	Mot nets	1-62914	Y	Y	Y
	Ivan Golubets	SLED A	21/09/2007	Mot nets	70828-1	Y	Y	Y
		SLED B	21/09/2007	Mot nets	70828-2	Y	Y	Y
	Altair 2	SLED A	3/07/2007	Mot nets	A1	Y	Y	Y
		SLED B	4/07/2007	Mot nets	A2	Y	Y	Y
SLED C		4/07/2007	Mot nets	A3	Y	Y	Y	
Raudal Fishing Ltd	Atria	SLED A	28/11/2007	Mot nets	AT1	Y	Y	Y
		SLED B	28/11/2007	Mot nets	AT2	Y	Y	Y
SERL	Sur Este 700	SLED A	13/09/2007	Hamp	SE 700 DN	Y	Y	Y
	Sur Este 707	SLED A	13/09/2007	Hamp	SE 707 DN	Y	Y	Y
	Sur Este 709	SLED A	13/09/2007	Hamp	SE 709 DN	Y	Y	Y
	Fleet Spare	SLED A	12/09/2007	Hamp	SER 4	Y	Y	Y
United Fisheries	Kapitian Rusak	SLED A	15/10/2007	Hamp	KRO1	Y	Y	Y
		SLED B	12/10/2007	Hamp	KRO2	Y	Y	Y
Trans Pacific Fishing L	Melilla 201	SLED A	18/10/2007	Hamp	M 201-1	Y	Y	Y
		SLED B	18/10/2007	Hamp	MEL 201 A	Y	Y	Y
	Melilla 203	SLED A	18/10/2007	Hamp	203 01	Y	Y	Y
	Fleet Spare	SLED A						
Aurora	Tomi Maru 87	SLED A	10/09/2007	Hamp	TM 87-01	Y	Y	Y
Maruha	A. Slobodchikov	SLED A	19/09/2007	Mot nets	SLOB1	Y	Y	Y
		SLED B	19/09/2007	Mot nets	SLOB2	Y	Y	Y
		SLED C	19/07/2007	Mot nets	SLOB3	Y	Y	Y
Fishmarket Holdings	A Ksenofontov	SLED A	15/10/2007	Hamp	AK N1 **	Y	Y	Y
		SLED B	19/10/2007	Hamp	AK SE N2	Y	Y	Y

\*\* Original ID last year was 'AK SE N1', but now has a weld across the 'SE', therefore new ID only shows 'AK \_\_ N1'





## **Appendix 5**

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### **Draft MFish SLED Specification for SQU 6T 2008 Operational Plan**

#### **DRAFT**

**October 2006 MK 3/13 SLED for draft approval by SLED WG 2008**

The SLED required for use by all vessels in the 6T squid fishery is an approved type that meets the following criteria:

1. The SLED must consist of a lengthener section of net, with either 2 or 4 seams, containing a 2 or 3 piece grid, hinged along the middle. The grid should be set in the net at about  $45^{\circ} \pm 5^{\circ}$  from the vertical with the top of the grid closest to the codend section and continuously sewn to the net meshes around its outer edge.
2. The grid must be constructed of minimum 20mm outside diameter solid stainless steel bar and should be shaped to conform to the working parameters of the net (refer diagram).
3. Vertical grid bars must be evenly spaced at a continuous maximum distance of 23cm between bars (see diagram). There will be no minimum number of bars, provided they are evenly spaced and do not exceed the recommended maximum spacing. It may be necessary to have the last spacing between the final bar and the grid frame differing from the rest of the spacings provided they are less than 23cm apart between bars and frame.
4. The escape hole must be triangular and let into the upper surface of the lengthener section. The hole must be a minimum of 130cm wide at the base, measured along the top bar of the grid. The apex of the triangle must be a minimum of 150cm forward of the base (refer diagram).
5. Above the escape hole, a hood-shaped mesh scoop must be attached with its open (leading) end facing into the water-flow and its closed (trailing) end attached & over stretched to the top bar of the grid. The leading edge of the hood must be a minimum of 90cm high when fully extended open and the leading edge rope around the mouth of the hood must be a minimum of 320 cm long, the back edge must be overstretched when fitted to the grid & minimum length of 170cm long (refer diagram).
6. The hood must have a semi rigid kite 220cm long by 32cm wide (both measurements + 10%) (a piece of conveyor-belt is ideal) attached under the meshes of the hood. The leading edge of the kite must be continuously attached to the leading edge of the hood and the back edge also attached to the hood netting. The leading corners of the hood must extend forward of the escape hole.
7. A single float of between 20cm & 30cm in diameter (a centre hole float is best) must be attached to the centre of the leading edge on the kite.
8. The SLED must be inserted into the trawl (between the body of the trawl and the lengthener) with the escape hole on the upper surface when the net is fishing.
9. Each SLED grid frame must have a unique registration number, identifying it as a unit, clearly stamped into the frame bar at each end of each hinge section. Deepwater Group Ltd will record each SLED registration number. DWG's register of SLED numbers must be provided to MFish on an annual basis before fishing commences.
10. There are elements of the SLED configuration that may vary, including: the presence or absence of floats attached to the outside of the grid or back of the kite, the shape, width and height of the grid, the number of vertical bars in the grid, the number of meshes in the hood and the number and size of meshes in the lengthener section, depending on the net in which the SLED is inserted.
11. No extra panels or mesh material may fitted inside the lengthener. Additional floats may be fitted inside the hood or lengthener behind the grid or frame.
12. Alterations are not to be made to the design outside of this specification. For new builds or major repairs contract Motueka Nets Ltd or Hampidjan NZ Ltd.

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