

# Information for Prawn Fishers submitting an Expression of Interest In On-board processing equipment

<b>CONTENTS</b>	<b>Page</b>
Detailed Information for Fishers Submitting an Expression of Interest	1
Expression of Interest	4
Innovation 1: Dipping tank reconfiguration to enhance dipping time and cold chain management during high volume harvest.	7
Innovation 2: Automated weighing, packaging system	
Innovation 3: Manual digital grading and handling capacity	
Innovation 4: Automated grading and handling capacity	
Innovation 5: Automated bycatch (fish) separator	

## Detailed Information for Fishers Submitting an Expression of Interest

### for an opportunity to obtain on-board prawn processing equipment at 50% cost as part of a research project

*Please consider this information carefully and use the attached Expression of Interest form to make your submission. A separate Expression of Interest form is needed for each vessel.*

*Questions should be directed to the Project Manager:*

*Dr Janet Howieson*

*Email: J. [Howieson@curtin.edu.au](mailto:Howieson@curtin.edu.au)*

*Mobile: 0423 840 957*

---

#### **Introduction**

This research project was developed by the Australian Council of Prawn Fisheries, Curtin University, the Queensland Department of Agriculture and Fisheries and the Fisheries R&D Corporation, all of whom are participants in the *Fight Food Waste Cooperative Research Centre (CRC)*.

The goal of the project is to reduce waste in the prawn fishing industry by improving on-board processing and packaging.

Detailed industry consultation to identify priorities/ opportunities for on-board processing improvements was undertaken. Five innovative processing equipment designs based on these priorities were subsequently identified as being suitable for installation on prawn trawlers and these designs were part of the EoI Round 1 and 2 for the project. Four installations are currently being designed, manufactured or are operating on case study vessels.

The CRC project is now looking for prawn fishers to take part in a third EoI to address the identified priority areas. The ACPF welcomes Expressions of Interest with alternatives and adaptations to the prototype designs we have shortlisted. If there are other ideas for innovations that improve on-board processing efficiency, we would also like to hear of them. We have design engineers who can be contracted if necessary to work with fishers to develop any new ideas.

It is anticipated that one or more of each of the innovations will be installed on separate vessels, depending on the level of interest. Efforts will be made to test the innovations in a range of fisheries and vessel types.

Depending on the number and location of respondents, briefing sessions for each innovation with the designer may be held at convenient time(s) and place (s).

The priorities still calling for innovations, whether previously developed innovations with approximate costs, or with potential for co-design are shown in Table 1, below.

Detailed descriptions of each developed innovation can be provided on request to the Project Manager. Co-design ideas can also be discussed with the Project Manager.

**Table 1: List of Priorities and Availability for Developed or Co-designed innovations**

Priority	Innovation Status	Supplier	Maximum Number remaining to be funded	2021 cost (costs likely to have increased)
Dipping tank and pre-processing storage innovation	Existing system has been designed and installed or Co-design	Cashcor or co-design	1	\$70,000
Automated on Board Packaging	Automated weighing, packaging system for a range of carton sizes. <i>Existing land-based machine, has been modified for on-board use and expected to be undergoing 2023 sea trials in Denmark.</i>	KM Fish Machinery, Denmark	2	\$215,000
Digital weighing and sorting for smaller vessels with aligned sorting tray/hybrid hopper modification	Digital scales with grading software for faster manual grading on vessels less than 14m as well as modified sorting tray/hybrid hopper	Peter Bullock Consulting + supplier or co-design,	1	\$9,000-\$20,000 (scales) \$20,000 - \$40,000 (modified tray/hopper)
Automated grader and modified catching tray	Automated twin roller grader* and modified catching tray for vessels longer than 14m. And/or sorting tray/hybrid hopper modification	Peter Bullock Consulting + manufacturer or co-design	1	\$50,000-\$64,000 (grader) \$5,000 - \$40,000 (modified tray/hopper)
Bycatch separation	Automated separation of fish bycatch from prawns.	KM Fish Machinery, Denmark or co-design	1	\$58,000

\* A larger (4 roller), more expensive version of this design, suited to vessels over 20m, was developed but has not been included in the project.

### Equipment Evaluation On-board

Vessel operators must agree to provide sufficient information to the CRC to enable each piece of equipment to be assessed for efficiency, effectiveness and return on investment. Examples may include shot size, number of crew on-board, prawn size grades, packaging used, power usage, packing time, etc

### **Financial details**

It is important to note that while the costs shown in the table above are based on quotes from manufacturers, they are still approximate. Actual costs will depend on the extent of modifications needed to each machine to suit the selected vessel, exchange rate and any import duties.

The CRC project will pay half the capital purchase price and the cost of shipping, packing, insurance of the machines (including those shipped to Australia).

Vessel owners must pay the other half of the capital cost, plus the cost of installing the machine on their vessel.

Vessel owners will need to pay their share of the purchase price to the CRC project in full before the machine is ordered\*. This amount is redeemable if the project does not proceed.

### **Ownership and Intellectual property.**

The CRC project will own the machine during the evaluation period\*. The vessel owner will assume full ownership and responsibility for the machine as soon as the evaluation is complete, expected to be after the first fishing trip.

If the machine is found to be unsatisfactory and the vessel owner has no further use for it, the CRC project will work with the vessel owner and the manufacturer to find a buyer for the machine, with the proceeds being shared equally. If a buyer cannot be found, disposal of the machine will be the responsibility of the CRC project, once it has been removed from the vessel by its operator\*.

Intellectual property generated during the project remains the property of the CRC project and will be publicly available unless specifically identified as being confidential.

*\*See KM Fish Machinery's trial offer on Prototype 1 (automated packaging) and 5 (Automated separation of fish bycatch from prawns) that affects payment, ownership and return of pre-payment if equipment operation is not successful. .*

### **Communication and Extension**

The vessel operator must allow other prawn fishers to observe the machine at reasonable times.

The operator and the CRC project may disclose information about the operation and performance of the machine to other prawn fishers, and any such communication materials prepared for distribution will be shared with the other party prior to distribution.

### **Letter of Agreement**

Each company that has an Expression of Interest accepted will need to sign a Letter of Agreement with the CRC project (Curtin University), that sets out the commitments of both parties.

The Letter will include performance specifications for the installed machine that have been agreed between the parties and evaluation criteria.

### **The Vessel Selection Process**

An independently chaired expert panel will assess all the expressions of interest. The panel will be comprised of an independent chair, the Project Manager, an independent third party with knowledge of prawn fishing vessels and the relevant design innovation consultants and another member from the project team. The ACPF will not be involved in the selection committee/process to avoid any perceived conflicts of interest.

The criteria for selection of vessels are reflected in the information requested in the Expression of Interest form. The panel will endeavour to install as many machines as the funds allow on a range of vessel types and fisheries.

Selection criteria include:

- The suitability of the deck arrangements and other technical aspects of your vessel
- The availability of skilled staff to operate the machine.
- Your willingness to share information about the installation with other prawn fishers.
- The likelihood that the innovation will reduce waste and increase efficiency in your business.
- The potential value to you of improvements resulting from the installation.

The panel may wish to interview the vessel operator and visit one or more vessels before making final decisions.

### **Ongoing Support**

Once a vessel has been selected for an innovation, the supplier will prepare a technical standard, and design for the new system on the specified vessel. The documentation will be sufficiently detailed to enable construction of the new system on a commercial trawler.

The Supplier will also be available in person or remotely, to assist with implementation and to provide operator guidelines and a preventative maintenance manual.

### **Submission of Expressions of Interest.**

These should be prepared using the attached form and sent to the Project Manager, Dr Janet Howieson, [J.Howieson@curtin.edu.au](mailto:J.Howieson@curtin.edu.au)

### **Closing Date**

The closing date for submission of EOIs is 28 Feb 2023.

## Expression of Interest

*Please note, there may be features of your vessel that impact on whether the installation is feasible. These include factors such as electrical power capacity, space, existing hopper design, load limits, and availability of skilled staff. It may be necessary for the design engineer to visit your vessel to determine these factors before the selection panel makes a final decision.*

Business name and ABN:

Contact Person and Contact Details:

Which innovations are you interested in? (Provide a number(s) from the table on page 2. If more than one, please specify your order of preference.)

Vessel name:

Vessel length:

Vessel Age:  
(the newer the better)

Times and port at which the vessel is available for inspection and installation:

Name, contact details and qualifications / experience of the person who will be responsible for the installation and operation of the machine at sea:

Please review the specifications provided in the detailed descriptions of each machine before answering the following questions:-

- Are there physical characteristics of the vessel's deck arrangement (including any modification of aligned equipment) that need to be considered for the installation of the innovation?
- Does the vessel have sufficient load capacity for your preferred innovation?
- Does the vessel have sufficient power capacity for your preferred innovation?

Fishery and species caught:

What benefits do you hope to gain from trialling machinery as part of this project? Eg reduced waste (both on your vessel and through the supply chain) through less ‘soft and broken’, reduced crew time (sorting & separating bycatch), improved financial return through better grading, less reprocessing costs etc

Is there any other information you would like to provide in support of your expression of interest?

Please tick each box below to indicate you agree with each of the conditions listed.

I agree to allow other prawn fishers to observe the innovation with appropriate forward notice at a reasonable time when the vessel is in port	
I agree to pay fifty percent of the capital purchase price, shipping, insurance, etc to the CRC before the innovation is ordered.	
I agree to providing information needed to evaluate the effectiveness and efficiency of the innovation	
I agree to pay installation costs	
I understand I will need to sign a Letter of Agreement to participate in this project.	

**Timeline:**

December



June

- Call for Expressions of Interest*
- Briefing sessions to discuss each innovation with interested industry and circulation of more detailed design to those interested*
- Final date for EOIs (28 Feb 2023)*
- Assessment panel meets, inspects vessels (if needed), announces decision*
- Discussions with successful applicants on costs, technical details, design, final machine / vessel specifications and timing of installations*
- Successful applicants sign Letter of Agreement with Curtin University*
- Last date for successful applicants to make payment of 50% of costs to FFW CRC*
- Orders placed for innovation/machines*

## FFW CRC and ACPF Project: On Board Processing and Packaging Innovation for the Australian Prawn Industry.

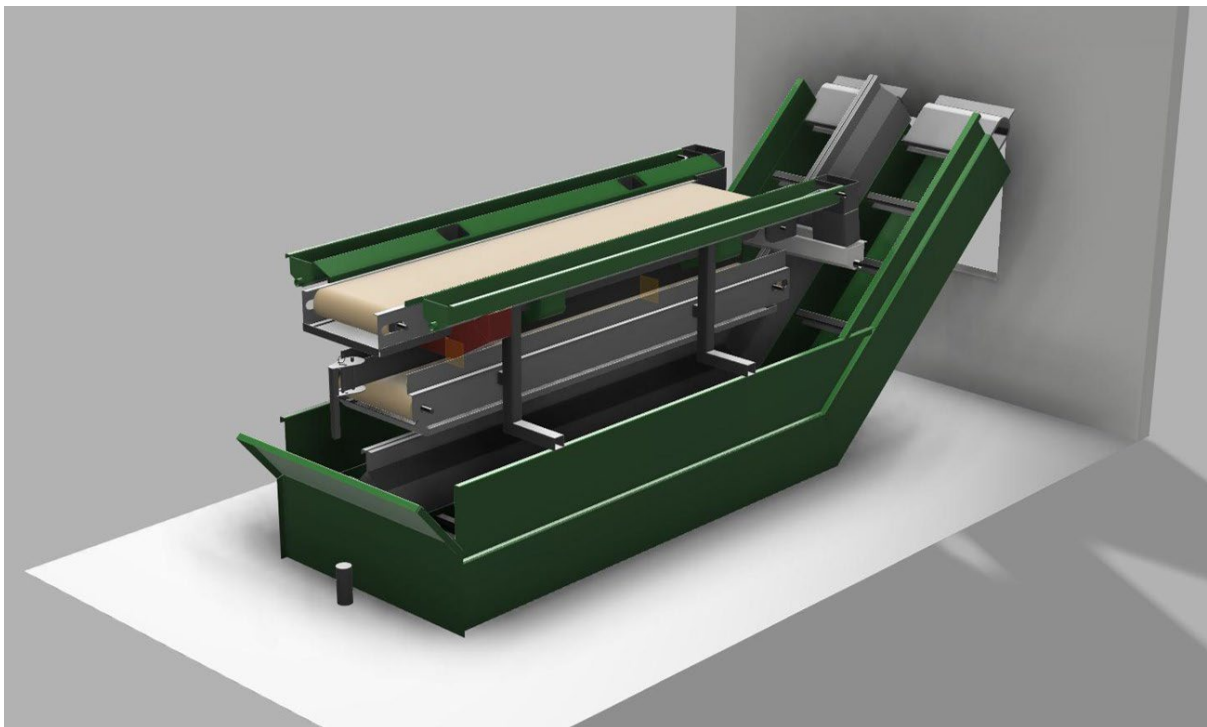
### Innovation 1: Dipping tank Reconfiguration to Enhance Dipping time and Cold Chain Management During High Volume harvest.

Background, Context.

In some fisheries there is a shift to enclosed processing areas which limits the use of sodium metabisulphite due to safety reasons. Also, alternate melanosis dipping treatments such as PrawnFresh are being used to target sulphite free markets. However these alternates require longer dipping times. Increasing dipping tank capacity, to allow prolonged dipping times, along with other modifications, could also improve cold chain management of product during high volume harvests (esp in NPF banana season).

Installation of larger tanks and dual conveyors to allow longer dipping has been successfully implemented in some NPF larger vessels (>24m) but, due to space limitations, this type of modification cannot be completed with current 20-24m trawler configurations.

Hence an innovative design has been developed and costed to allow longer dipping times and increased tank capacity in the smaller vessels. This design is to merge the dip tanks with the sorting conveyor in a layered design.



#### Operation

- Catch travels along belt as normal.
- Bycatch directed into overboard chute.
- Prawns directed into secondary conveyor to start of dip tank.
- Dip tank transports prawns at correct speed to piano.
- Dual lane to alternate sides; Total height = 1.3m; Similar footprint to most sorting belts
- Can't put baskets underneath for by-product.



**Considerations**

- Only suitable for vessels that currently use a sorting belt.
- Expensive
- Some modifications may need to be made on the deck (net decks) above sorting conveyor.
- Removes ability to use lugs under the sorting conveyor.
- Can be commercially fabricated (engineering design and approximate costing completed).

**Cost**

~70K in 2021.

## **FFW CRC and ACPF Project: On Board Processing and Packaging Innovation for the Australian Prawn Industry.**

### **Innovation 2: Automated weighing, packaging system**

#### **Background, Context.**

ACPF retail research is showing an emerging and significant consumer shift to prepacked frozen retail boxes in smaller volumes (500-2kg). Automatic packaging of such volumes on board will have benefits and quality improvements by packing ready to eat cooked/raw prawn products in small retail ready options. Land-based repacking into smaller volumes will therefore not be necessary. Automation of on-board packaging may also improve labour efficiency.

#### **Design**

See following design drawings by KM Fish Machinery.

Land Based 10 head and similar 14 head multi weighing machines have been in use for some years and are very reliable. KM has modified the machine and electronics with new software to allow for on-board operation.

It is possible to online with this machine to allow rapid follow up/service if anything goes wrong.

#### **Considerations**

On board Internet requirement for operation and maintenance advice.

This machine and setup will also be usable in a land-based production for many different products.

It would be optimal to have manufacturer on board when installing and then to train crew.

However as the manufacturer is Denmark based, it is likely that video communication will be required to advise on installation specifications for the selected vessels. The manufacturers then modify the machine as needed, before sending and testing.

The proposed system is designed so it will still be possible to pack manually if the Multi weighing machine is not working. Prawns can pass through for manual packing. (at the end of Pos.5 in design drawing).

#### **Costs**

See following.

# KM On-Board Multi Head Weighing Machine

**“The KM Game Changer” The worlds first onboard multi weighing machine.**

## The KM On-Board Multi head weighing machine features:

- Waterproof stainless-steel frame
- Waterproof level IP67
- Step motor and load cell unit in aluminium or SUS304 Housing
- Stagger dump to avoid blocked discharge chute
- User friendly touch screen equipped with multiple language
- 10.4-inch touch screen
- 99 pre-set programs for multiple tasks
- Collecting hopper with step motor or pneumatic
- Stagger dump avoid materials pile up
- Dimpled or Teflon treated plate on all product surfaces
- Overweight discharge equipment with step motor or pneumatic

*Minimized environmental impact  
Ecological sustainability  
Lower operating cost  
Less water and cleaning agent usage  
100% recyclable materials  
Reduced down time and giveaway*



Powered by KBS



## Technical specifications:

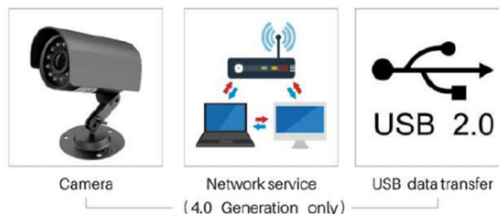
Spec / Model	10 Head
Voltage	230VAC/50Hz
Power	2.0Kw
Weighing Heads	10
Bucket Capacity	1.3L/2.5L
Max. Speed	75BPM
Max. Weighing capacity	3kg
Min. Weighing capacity	10g
Protection class	IP67

Approx. capacity on a 10 Head doing fresh or cooked HOSO Prawns based on size 55 gr.

1 kg boxes 40 per minute = 2400 kg/H  
3 kg boxes 17 per minute = 3060 kg/H  
4 kg boxes 12 per minute = 2880 kg/H  
5 kg boxes 12 per minute = 3600 kg/H  
10 kg boxes 6 per minute = 3600 kg/H

Minimum batch size 50 gr.  
depending on unit weight.

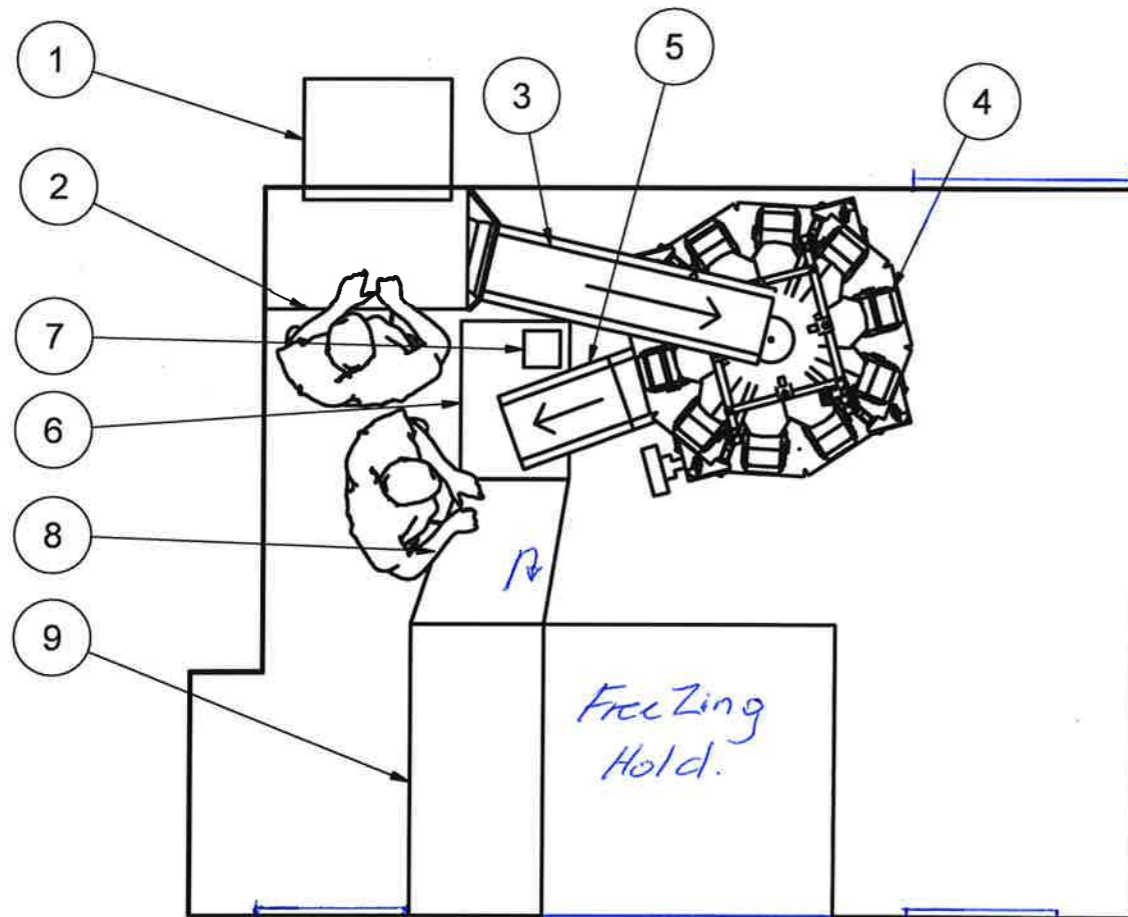
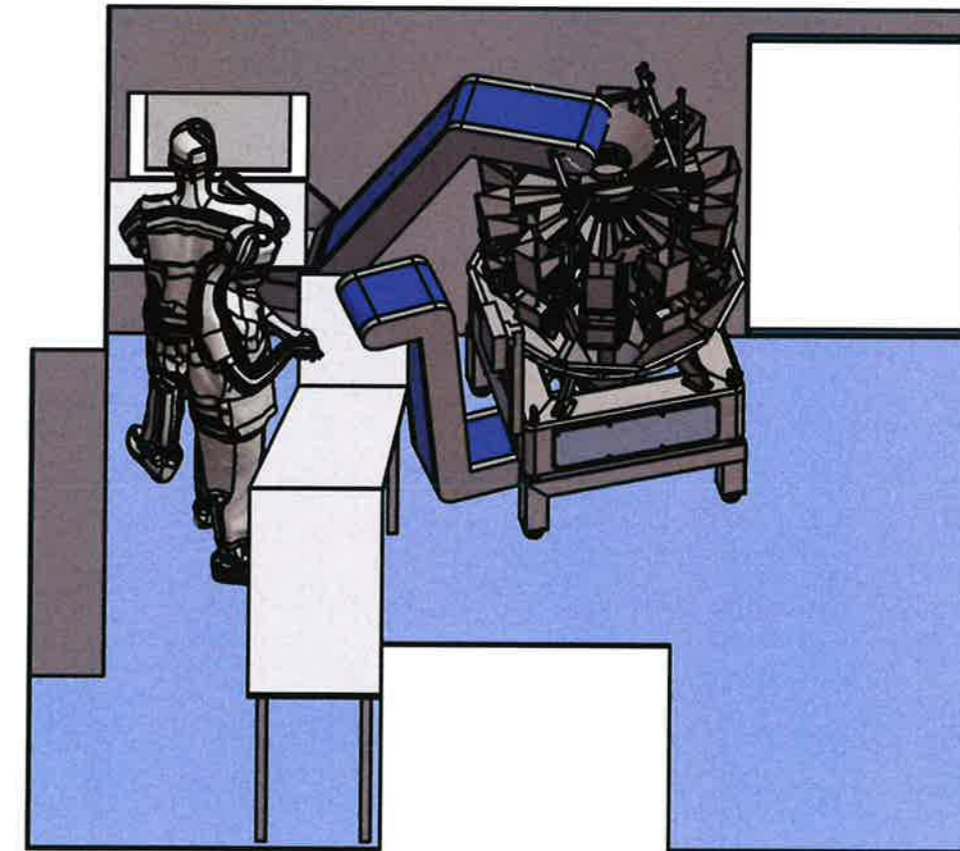
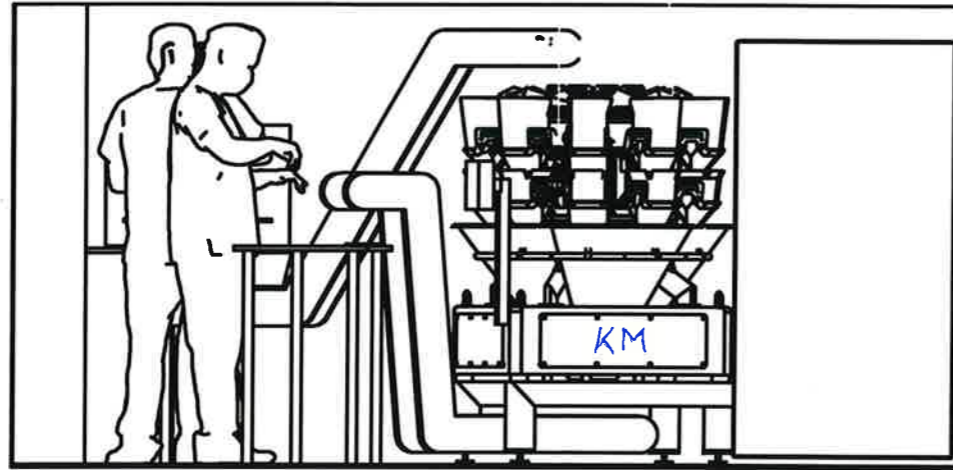
## Special features:



Specifications are subject to changes without notice.

**K.M. Fish Machinery A/S**  
Falkevej 15 – 17  
DK-9352 Dybvad  
Denmark

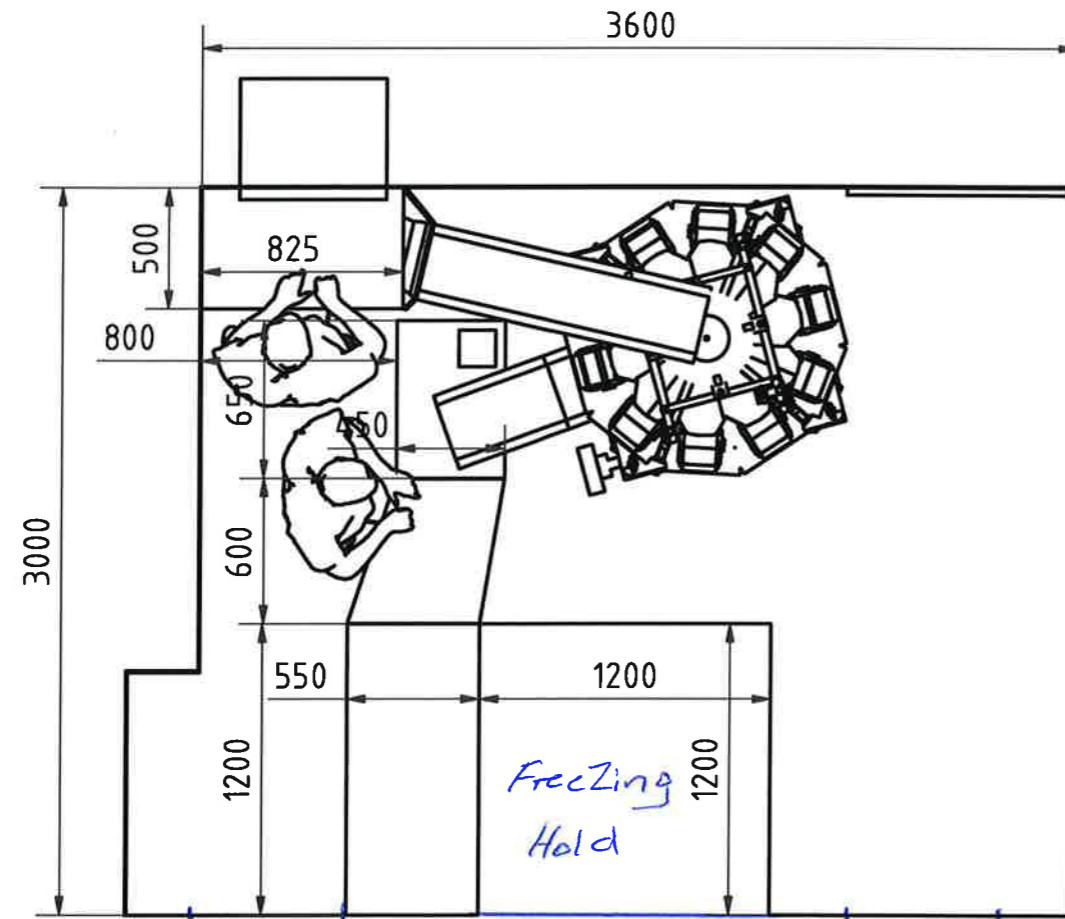
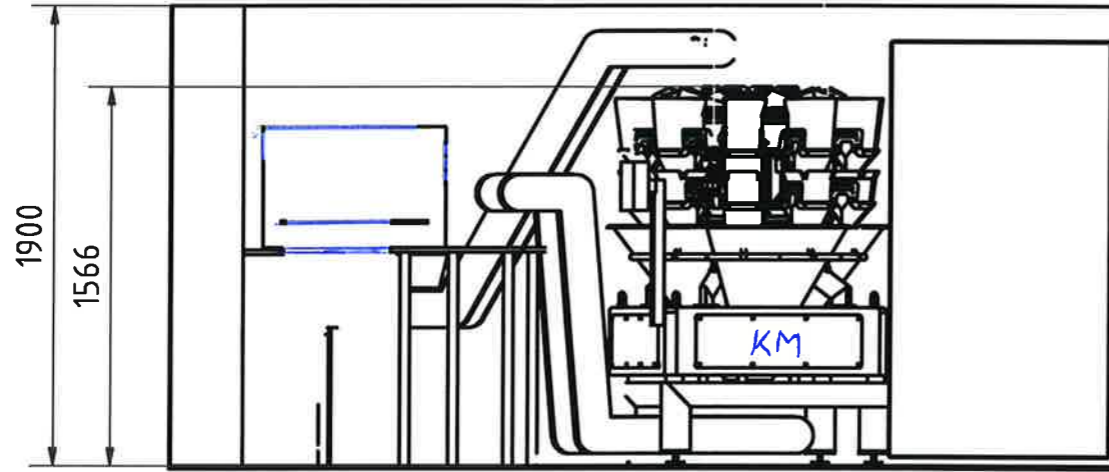
**Telephone: +45 98 86 46 33**  
**Telefax: +45 98 86 46 77**  
**E-mail: km-fish@km-fish.dk**  
**Web-site: www.km-fish.dk**





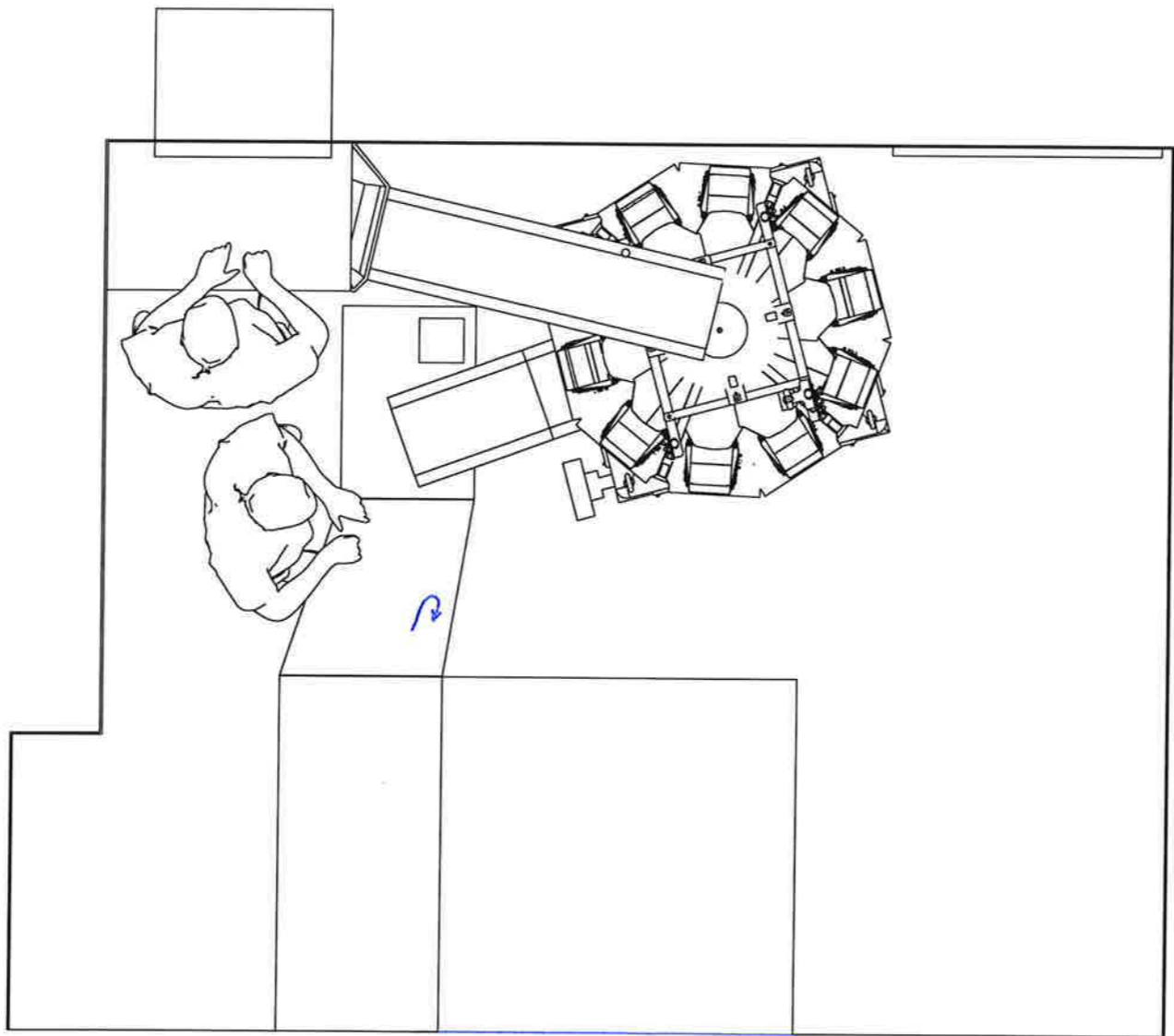
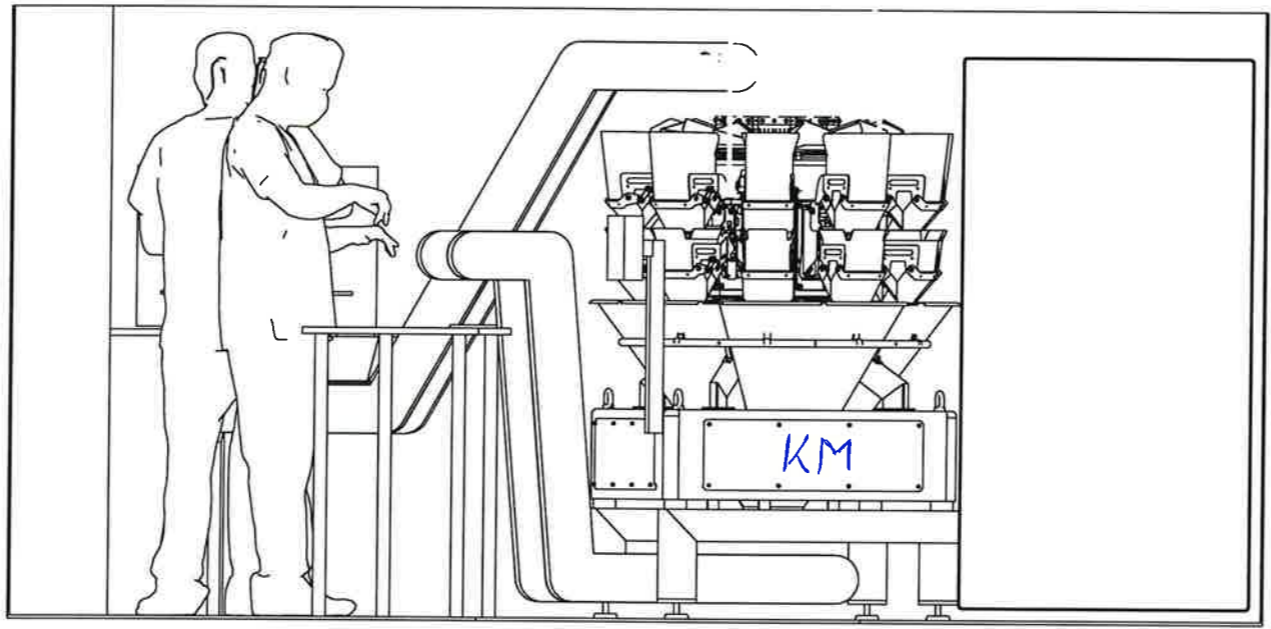
A= Option Box rack above pos. 5

9	Master packing table w/box rack	Master packing table w/box rack	1	Generic	
8	Hinged table	Hinged table	1	Generic	
7	Check scale existing	Check scale. existing	1	Generic	Movable
6	Packing table w. box rack A	Packaging table, with box rack. A	1	Generic	
5	Packing conveyor	Packing conveyor.	1	Generic	
4	Special made 10 head machine	Weighing machine.	1	Generic	
3	Feeding conveyor	Feeding conveyor.	1	Generic	
2	Inspec table	Inspection table.	1	Generic	
1	Outside infeed hopper	Outside infeed hopper.	1	Generic	
POS	ITEM NO.	DESIGNATION	QTY	MATERIAL	DIMENSION
CUSTOMER	MATERIAL	DIMENSION	SCALE 1 : 30	FORMAT A3	SHEET 1 / 3
PROJECT	WEIGHT N/A	DXF	FILENAME MODEL		
	DATE 05/08/2021		FILENAME DRAWING		
	DESCRIPTION KM GAME CHANGER				
	TOLERANCE		DRAWING NUMBER		
	Unspecified dimensions according to DS/ISO 2768 - 1 medium				

KM Fish Machinery



CUSTOMER	MATERIAL	DIMENSION	SCALE 1 : 30	FORMAT A3	SHEET 2 / 3
PROJECT	WEIGHT N/A	DXF	FILENAME MODEL		
	DATE 05/08/2021	FILENAME DRAWING			
	DESCRIPTION	KM GAME CHANGER			
	TOLERANCE Unspecified dimensions according to DS/ISO 2768 - 1 medium		DRAWING NUMBER		



**Curtin University Perth**

**Australia**

**Att. Dr. Janet Howieson**



**Dybvad 19/8 – 2021**

**We take pleasure in forwarding our quotation for an Onboard weighing packing system.**

- Pos.1**      **Option to be quoted in connection with a more automated system to reduce manual work/handling, getting a higher quality / accuracy graded product. Including etc. automatic separation of catch by using a bypass separator, higher accuracy grading, automated dipping system or Cooking / Chilling system and infeed system to packing room.**
- Pos.2**      **1 only Inspection table**
- Pos.3**      **1 only Feeding conveyor for KM multi head weighing/packing machine**
- Pos.4**      **1 only KM multi head weighing/packing machine (The KM Game Changer). Please see attached brochure.**
- Pos.5**      **1 only Packing and batching conveyor which runs together with “The KM Game Changer” feeds the prawn portions down into in separated areas and bring this up to box packing. Packing / Batching conveyor will be activated by the operator when placing an empty box for packing.**
- Pos.6**      **1 only Packing table with box rack for empty boxes.**
- Pos.7**      **1 only Existing scale to test check some packed boxes.**
- Pos.8**      **1 only Hinged Packing table section, can by hand be closed down to make 600 mm access true this area.**
- Pos.9**      **1 only Packing table (for master packing) with box rack for empty boxes.**

**All above delivered complete with electric and pneumatic boards ready for connection to 3 x 415 volt 50 Hz and compressed air.**

**Pre a sampled and tested in Denmark (video and photos for installation).**

**Total price excl. shipping, packing, insurance and installation**

**Euro 122,100.00**

**Curtin University Perth**

**Australia**

**Att. Dr. Janet Howieson**



**Dybvad 19/8 – 2021**

## **Conditions**

**Supervision and onboard test:** Looking on the Covid situation just now it can be difficult to get allowed to visit Australia, most likely we will need to make this as a removed installation and make a video when pre a sampling all before sending and testing. Optimal would be to be onboard when installing and when fishing to train crew. Pricing of this is difficult as Ticket prices changes depending on traffic situation and final destination.

**Time of delivery from our factory:** approx. 4 - 6 working weeks from receipt of order and pre-payment. Subject unsold

**Shipping time by Air to Hong Kong and Sea to Brisbane :** approx. 4 weeks to Brisbane.

**Term of delivery:** Ex works Dybvad, Denmark.

**Packing excluded:** Packing material / boxes and packing time to be Invoiced separately.

**Terms of payment:** 50% at order.

**Proposal** 50% could be 30days after installation and test onboard, not later than 60 days after arrival to Australian port.

Can be negotiated and delayed if performance doesn't work as contracted.

**Guarantee and terms of delivery:** According to ORGALIME S. 2012

**Validity date:** Until October 31st 2021 (Subject unsold)

**Vat:** The above prices do not include Australian VAT and customs clearance.

**Yours faithfully,**  
**K.M. FISH MACHINERY A/S**

*Kaj Christensen*



## **FFW CRC and ACPF Project: On Board Processing and Packaging Innovation for the Australian Prawn Industry.**

### **Innovation 3 Manual digital Grading and Handling capacity**

#### **Background**

Improving grading accuracy and efficiency could address fishers' most important challenges and priorities and could provide both operational and commercial benefits.

Currently available options to introduce grading automation and improved accuracy are either only designed for the very large vessels or have not yet been fully developed or professionally engineered and do not integrate with the sorting and catch tray operations on the smaller and medium sized vessels.

It was therefore recommended that a design process be undertaken to develop a completely new automated grading system suitable for the Australian Wild Prawn Industry and which could form part of an integrated solution with the sorting and catch tray operations, particularly onboard the medium sized vessels.

In addition, a solution is needed for smaller vessels where very limited space and deck configuration does not allow installation of an automated grading solution.

#### **Innovation 3 - Manual digital grading solution**

- ✓ Vessels <14m long
- ✓ Any other vessels where manual digital grading would be of benefit
- A digital marine scale with software that incorporates the ability to rapidly grade prawns with grade clearly visible on display (both positive and reverse grading)
- 316 stainless steel construction with at least IP67 water resistance
- Ability to connect to a computer or printer to record grading results

This solution can be accommodated using intelligent digital scales in place of the old mechanical scales so commonly seen onboard the smaller trawlers.

- Incorporating grading software and be able to conduct positive grading where prawns are added to a box/crate on a scale or negative grading where prawns are removed from the box/crate on the scale
- Incorporating a digital display that will clearly show the grade of each prawn weighed so that the crew member can rapidly grade the prawns into different sizes and place the graded prawns into their respective boxes/crates
- An innovative on-deck solution is to incorporate a marine scale complete with grading technology that is connected to a series of lights, one for each grade. Crates for each grade are placed next to the lights and illumination of each light would clearly indicate the crate where the prawn should be placed.

This is a very user-friendly solution that is easy for crew members to use without having to constantly look at the digital display. Crew simply focus on handling the prawns and looking to see which light illuminates for each prawn removed from the crate on the scale (negative grading)

- A high degree of accuracy can be achieved, even using a marine scale (motion compensated). An accuracy of 2g can be achieved when using a 15Kg marine scale with for example a 5 Kg crate of prawns on the scale. The weight of each prawn removed would be accurate to 2g. This accuracy can be increase when using smaller capacity scales.

There are a variety of scale manufacturers who supply scales suitable for weighing in onboard situations. They vary in both quality and features with only a few offering more advanced software solutions and the ability to connect to other devices.

There are currently no scale manufactures offering the innovative grading solution described in this innovation. Marine scales with grading software that can be used as a basis for this solution are as follows.

The Marel marine scales incorporate specialised grading software that allow both positive and negative grading.

### **Innovation 3 (a) – Custom designed catch tray/hybrid hopper to accompany the manual digital grading solution**

The option of including a new custom designed catch tray/hybrid catch hopper, specifically designed to each vessel's requirements, to accompany the manual digital grading solution.

- Designs are currently being developed by other projects and these will need to be customised for each vessels space and requirements
- Current design work for a catch tray/hybrid hopper will improve bycatch separation and sorting operations as well as reduce bycatch mortality and further improve the operating environment for the crew
- This further innovation when accompanied by the manual digital grader innovation will provide significant operational and commercial benefits.
- To accommodate situations where an existing catch tray cannot be modified, the indicative order of cost table below includes for a new catch tray/hybrid hopper.



# Marine Scales

Fast, stable and reliable



## ADVANCED *M2200*

Division from: 0.5 g ( 3kg scale)  
On-board weighing, packing and labeling  
Range of grading programs  
Controls hoppers and conveyors  
Programmable on site  
Catch reporting and traceability  
Packing registrations: catch area, box number, haul number  
Display with under/overweight indicator  
TCP/IP network connections via Ethernet - CAN open and RS232 port  
Robust and hygienic 316 stainless steel design - IP67/ IP69K



## INTERMEDIATE *M1100*

Division from: 0.5 g ( 3kg scale)  
On-board weighing, packing and grading  
Three types of grading modes  
Display with under/overweight indicator  
Robust and hygienic 316 stainless steel design - IP67/ IP69K



## BASIC *M1100e*

Division from: 20 g (30 kg scale) & 50 g (60 kg scale)  
Fast, stable and reliable on-board weighing  
Robust and hygienic 316 stainless steel design - IP67/ IP69K

The MacWay marine scales also incorporate specialised grading software that allow both positive and negative grading.



## Marine Scales

### Marine Weighing Technology

## Marine Scales

Accurate at sea in motion weighing  
Page 1

### Fast accurate display

- 316 Stainless Steel
- Harsh wash down
- Range of base sizes
- Stainless load cells
- Motion compensated
- Ryco #820 Indicator
- Positive and negative grading software
- Piezo keyboard operation
- Red LED display
- LCD user prompt display
- Set point outputs
- Fine resolution accuracy
- Mains or battery power
- Low operating costs



Model No:	Width (mm)	Length (mm)	Capacity
MW 2300	200	300	15kg by 5g, 6kg by 2g
MW 3400	300	400	30kg by 10g, 15 kg by 5g
MW 4500	400	500	60 kg by 20g, 30 kg by 10g
Small Lab balance			3000g by 1g, 300g by .1g

**Indicative order of cost:** (expressed as a range and to be updated in the later stages of the concept design stage)

It is too early to provide detailed capital costs for equipment and solutions prior to the formal design phase of the project. However, based on early discussions, analysis and budget quotations and combined with similar project experience, it is possible to provide indicative order of cost ranges that can be used in preparation of EOI documentation for a process to identify a suitable case study trawler.

Items	Improvement	From \$	To \$
1	<b>Digital marine scale with grading software</b> (various capacities available e.g. 3Kg; 5Kg; 10Kg, 15Kg, 30Kg)	<b>\$7,000</b>	<b>\$15,000</b>
2	<b>On deck grading solution</b> (Grading lights, cabling, connection and control system)	<b>2,000</b>	<b>\$5,000</b>
3	<b>New catch tray or hopper hybrid system</b> (Where needed and if possible)	<b>20,000</b>	<b>\$40,000</b>

## **FFW CRC and ACPF Project: On Board Processing and Packaging Innovation for the Australian Prawn Industry.**

### **Innovation 4:** Automated Grading and Handling capacity

#### **Background**

Improving grading accuracy and efficiency could address fishers' most important challenges and priorities and could provide both operational and commercial benefits.

Currently available options to introduce grading automation and improved accuracy are either only designed for the very large vessels or have not yet been fully developed or professionally engineered and do not integrate with the sorting and catch tray operations on the smaller and medium sized vessels.

It was therefore recommended that a design process be undertaken to develop a completely new automated grading system suitable for the Australian Wild Prawn Industry and which could form part of an integrated solution with the sorting and catch tray operations, particularly onboard the medium sized vessels.

In addition, a solution is needed for smaller vessels where very limited space and deck configuration does not allow installation of an automated grading solution.

#### **Innovation 4 (a) - Automated Twin Roller Grader Solution**

- ✓ Vessels <14m long (dependent on space and configuration)
- ✓ Vessels <20m long
- ✓ Vessels >20m long
  
- Compact design to ensure a good fit onboard small to medium vessels <14m long and <20m long
- A design to allow an installation inline or at 90 degrees to the catch tray/hopper to further save on space
- The ability to customise the equipment size where space is severely limited on smaller vessels
- Accurate grading
- Ability to grade into all commonly used sizes simultaneously e.g. U8; U10; U15; 16-20; 21-30 or other configurations as required
- Fully adjustable for distance between rollers, angle of rollers, speed of rollers, angle/position of grading chutes to finetune throughput, grades and product handling
- A standalone solution or a fully integrated solution interfaced with existing catch trays/hoppers which allows prawns to be directly fed to the grader while also allowing waste or other species to be directed elsewhere, improving product sorting and operations for crew
- The option of including a new custom designed catch tray/hybrid catch hopper, specifically designed to each vessel's requirements, and fully interfaced with the integrated automated grading solution.

Designs for this are currently being developed by other projects and these will need to be customised for each vessels space and requirements.

Current design work is for a catch tray/hybrid hopper which will improve bycatch separation and sorting operations as well as reducing bycatch mortality and further improving the operating environment for the crew

This further innovation interfaces seamlessly with the integrated automated grader innovation and when combined will provide significant operational and commercial benefits.

For this reason and to accommodate situations where an existing catch tray cannot be modified, the indicative order of cost table below includes for a new catch tray/hybrid hopper.

- A new highly engineered automated twin roller grader design with a compact double deck roller system, specifically designed for the Australian Prawn Fishery
- New and unique design incorporating concurrent grading on both roller decks to maximise grading accuracy and throughput
- High quality engineering ensures long life and reliability
- Up to 400Kg per hour (depending on species, product condition etc)

#### Innovation 4 (b) - Automated Four Roller Grader Solution

- ✓ Vessels <20m long (Higher catch vessels and where space allows)
- ✓ Vessels >20m long
- For vessels with higher catch volumes which also have available space in the < 20m and >20m length categories, the same fully integrated solution is available as a 4-Roller Grader Solution. This solution has the same features and benefits as the twin roller system with the added benefit of throughput up to 800Kg per hour (depending on species, product condition etc)

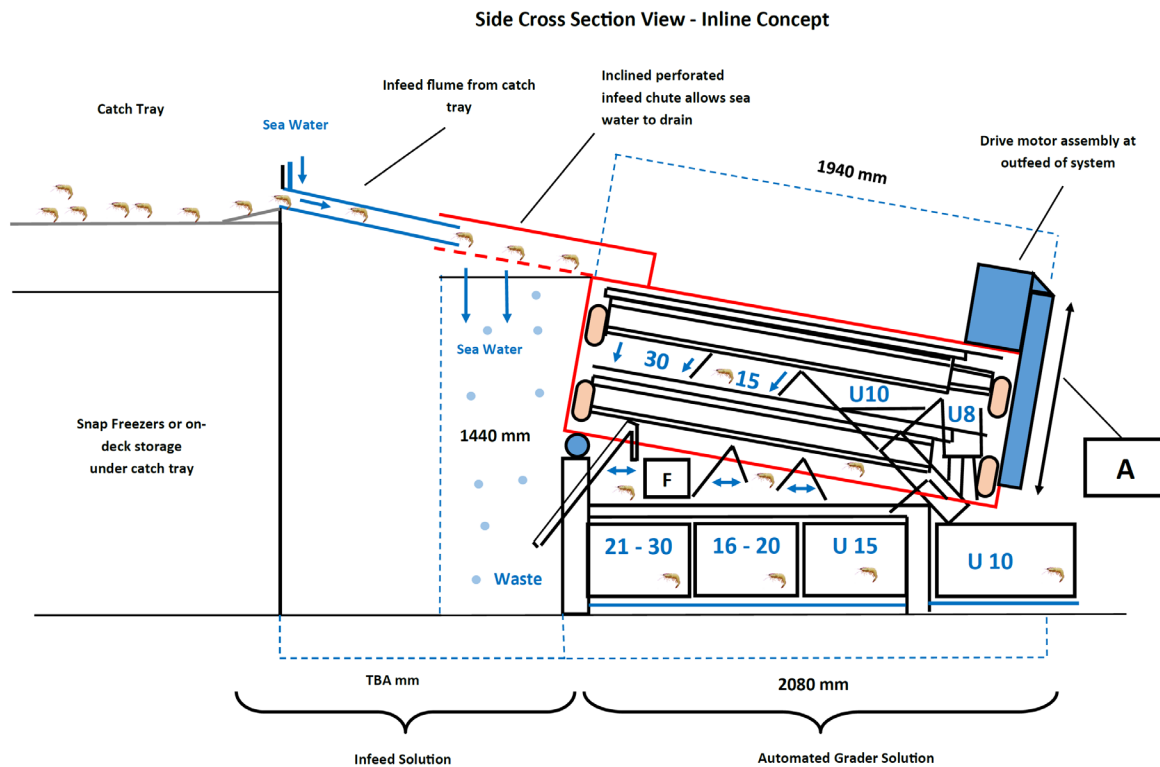
#### Benefits:

Item	Objective	Challenge Category	Benefits
1	Modified Existing Catch Tray (or new catch tray/hopper hybrid) Full integration with New Automated Compact Roller Grader	Key Priority	<i>Increased Processing Efficiency</i> <i>Improved Sorting</i> <i>Improved Quality Grading</i> <i>Easier Bycatch Separation</i> <i>Improved Ergonomics</i> <i>Improved Work Environment</i> <i>Better Crew Retention</i>
<b>Integrated Solution - Sorting to Grading</b>			
2	New Automated Compact Roller Grader	Key Priority	<i>Increased Accuracy</i> <i>Fewer Customer Downgrades</i> <i>Fewer Customer Rejections</i> <i>Higher Value Product</i> <i>Increased Margins</i>

**The following are conceptual 2D (side view, infeed view and outfeed view) and 3D drawings for an integrated inline catch tray/automated grader solution**

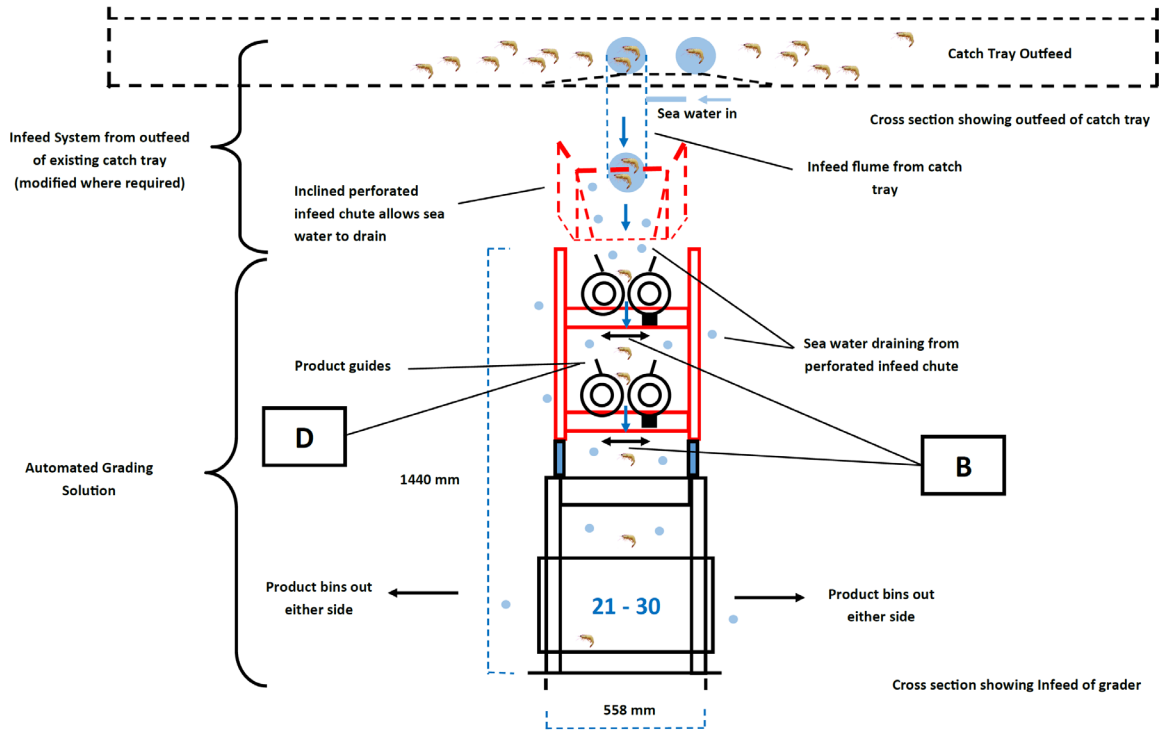
**Key to Conceptual Drawings:**

- **A** = Quick adjustment of grading angle on the rollers (easily adjusted with a wheel) for control of prawn speed along the rollers to optimize grading accuracy and capacity
- **B** = Quick adjustment from 10 - 30 mm distance between grading rollers inlet/outlet on upper and lower deck can be done while machine is running. Each adjustment has a visible indicator showing distance with 0.1 mm accuracy.
- **C** = Roller gearmotors on both Rollers in anti-clockwise and clockwise rotation to ensure prawns easily moving and not dropping too early
- **D** = Spay system to keep roller wet and guiding plates to avoid prawn jumping out
- **F** = Adjustable guiding plates between grades

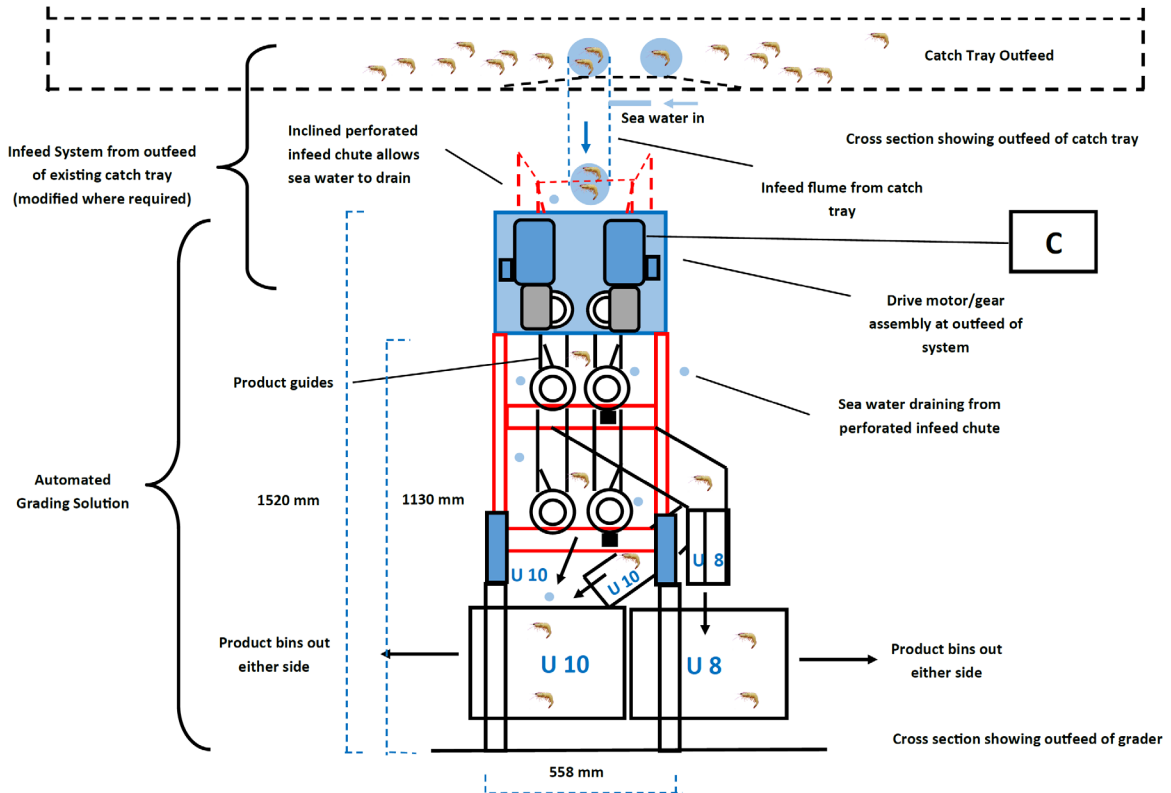




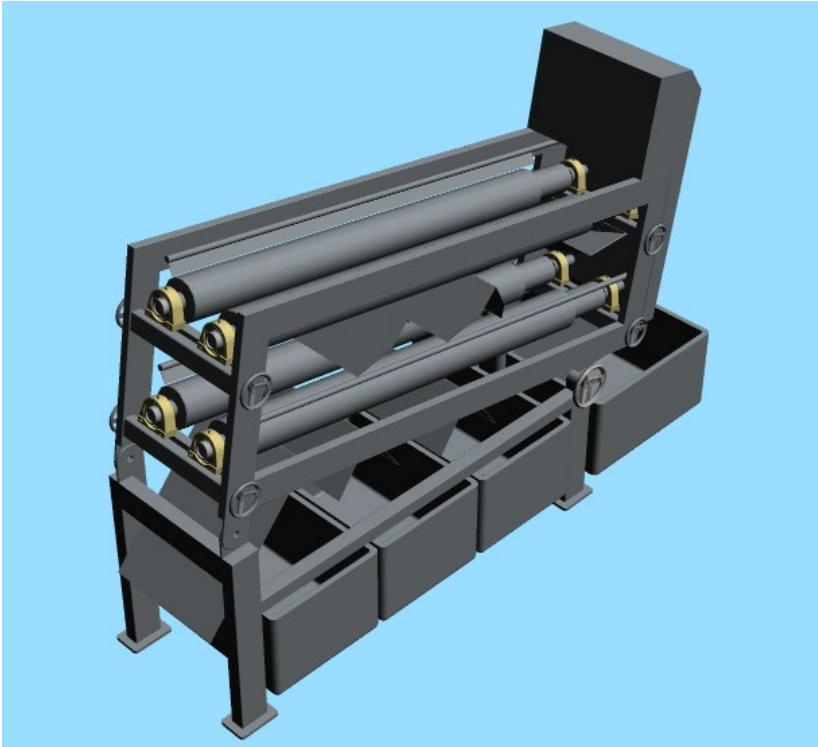
**Infeed Cross Section View - Inline Concept** (looking from catch tray towards automated grader)



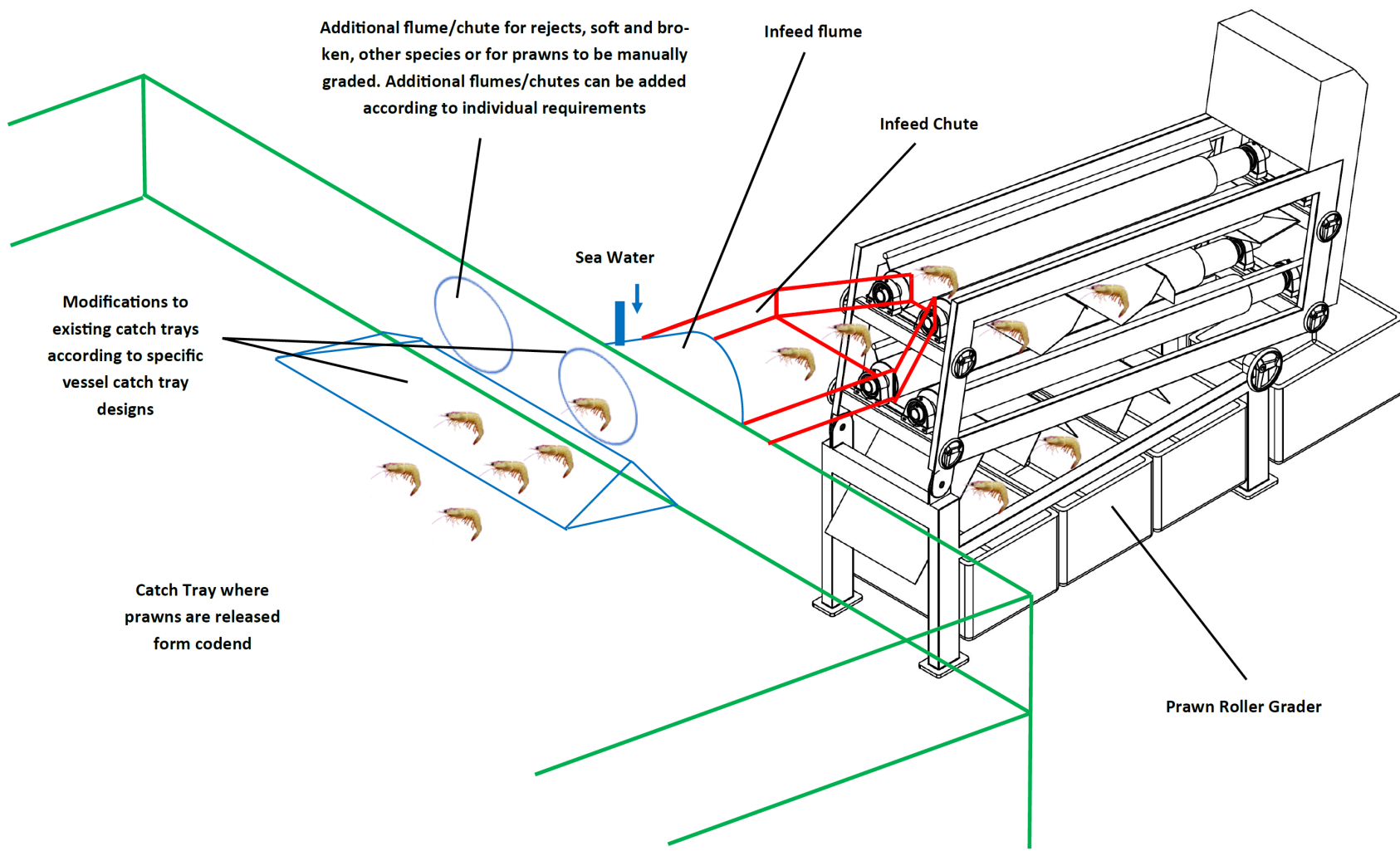
**Outfeed Cross Section View - Inline Concept** (looking from automated grader outfeed towards catch tray)



***3D Design Model - New Compact Automated Prawn Roller Grader***



### 3D Concept Design Sketch - Integrated Inline Solution



**Indicative order of cost:** (expressed as a range and to be updated in the later stages of the concept design stage)

It is too early to provide detailed capital costs for equipment and solutions prior to the targeted design phase of the project. However, based on early discussions, analysis and budget quotations and combined with similar project experience, it is possible to provide indicative order of cost ranges that can be used as part of EOI documentation for a process to identify a suitable case study trawler.

Items	Improvement	From \$	To \$
1	<b>Modificarions to existing catch tray arrangements</b>	\$5,000	\$10,000
2	<b>New catch tray or hopper hybrid system</b> <i>(only where needed and if possible)</i>	20,000	\$40,000
<b>Innovation 4 (a) Compact Automated Twin Roller Grader Solution (Up to 400Kg/hr)</b>			
3	<b>Grader transfer and delivery system</b>	\$8,000	\$16,000
4	<b>Twin roller automated prawn grader</b>	\$43,000	\$49,000
<b>Innovation 4 (b) Comppact Automated Four Roller Grader Solution (Up to 800Kg/hr)</b>			
5	<b>Grader transfer and delivery system</b>	\$10,000	\$18,000
6	<b>Four roller automated prawn grader</b>	\$74,000	\$80,000

## **FFW CRC and ACPF Project: On Board Processing and Packaging Innovation for the Australian Prawn Industry.**

### **Innovation 5: Automated by catch (fish) separation**

#### **Background, Context.**

On many trawlers, bycatch separation, once the catch is on board (noting multiple bycatch reduction activities are already implemented pre net haul), is conducted manually. Automatic separation of fish and prawns has been developed and implemented in Denmark, and an opportunity exists to trial this technology in the Australian context.

#### **Design**

Video of the automatic by-catch Separator is at the following link.

<https://intech.kontainer.com/shared/AhW1TdxvmAT8zOqMt10kWJktUwR8uhi9>

see Design in next pages.

#### **Considerations**

Standard model is electricity driven.

Standard length is 1000 mm width (but also comes in 400,800,900,1000,1100,1250,1800,2000 mm and also XL length)

#### **Cost**

As this is the first trial of the device in Australia, the manufacturer has offered a free trial period. The offer requires the customer to pay freight, packing and a supervisor for startup run in, then device will be provided. It can be returned if the trial is unsuccessful. .

Price ex works Denmark

1 only Separator standard length width 1000 mm (BS-1000-E-E / 701004300)

Including control board. Euro 33,826,00 (~\$54.121)

1 only SS frame for above Euro 2,073,00 (~\$3316.8)

Not included in price: packing, freight, insurance (depends on shipping and destination).; supervisor for installation. (can travel from Denmark).



Powered by Intech

## Bycatch Separator

### SEPARATES SMALL FISH FROM SHRIMP AND PRAWNS

Conveyor 1 is intended for rough sorting and conveyor 2 for careful sorting. The incline is used for adjusting the balance between the catch conveyed upwards (the fish) and the catch falling back (the shrimp). Conveyor 1 must always be more flat (less steep) than conveyor 2, to prevent the shrimps from being conveyed to the collecting vessel along with the fish. There is a screen installed on conveyor 1. The purpose of the screen is to prevent the mixture coming from conveyor 1 from rising too high on conveyor 2, giving the mixture more time to separate on its way upwards on conveyor 2.

It is important to be aware that as the conveyor belts become worn, the friction increases, making it necessary to adjust them, i.e. make them more steep.

#### Technical data

Motor type	Drum motor
Motor Power	0,37 kW
Power supply	3x 400 V or 3 x 220 V
Full Load Amps (FLA)	3A / 0.8 kW

#### Highlights

The machine handles the manual and tedious work

Comes in many different widths and in an XL length. Many different capacities - the largest with over 120 tons per 24 hours

Shrimps are produced in much shorter time

The final result is of perfect quality

Can be made for all capacities

#### Optional extras

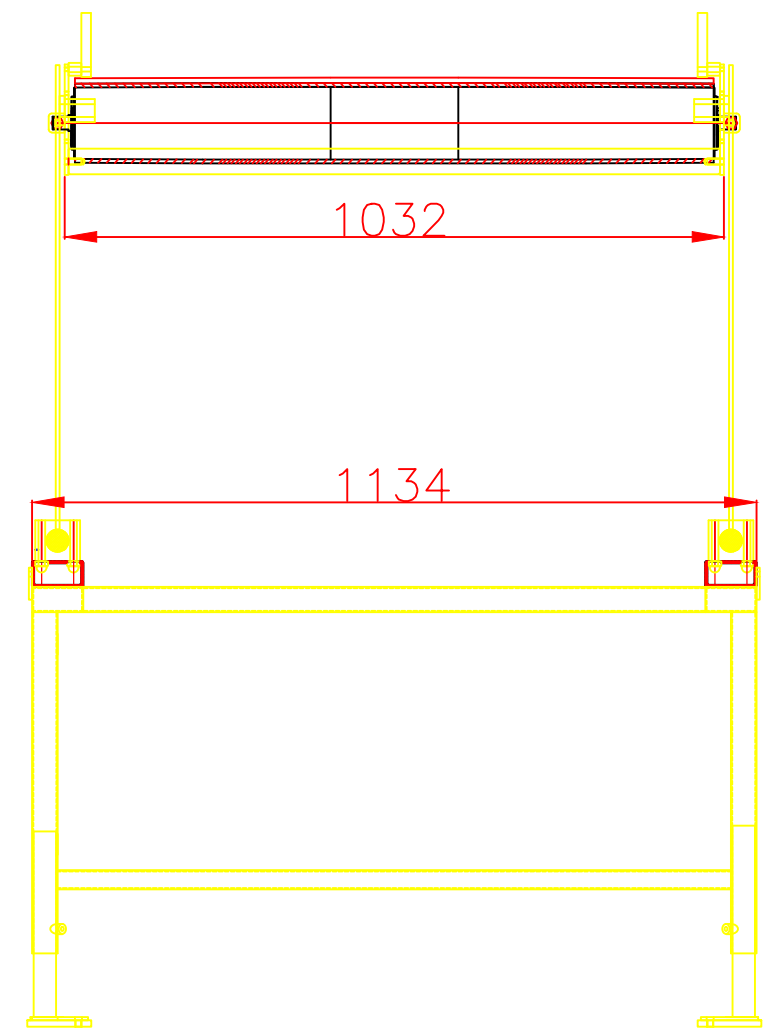
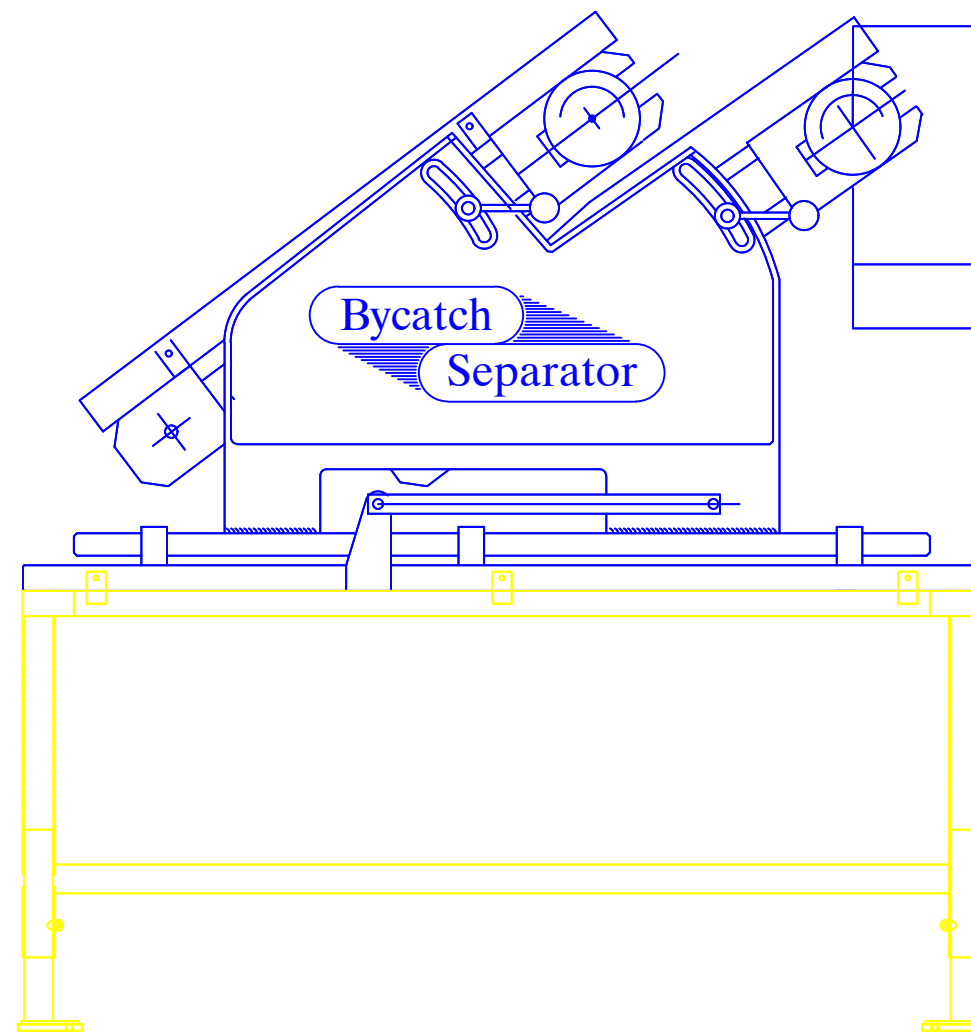
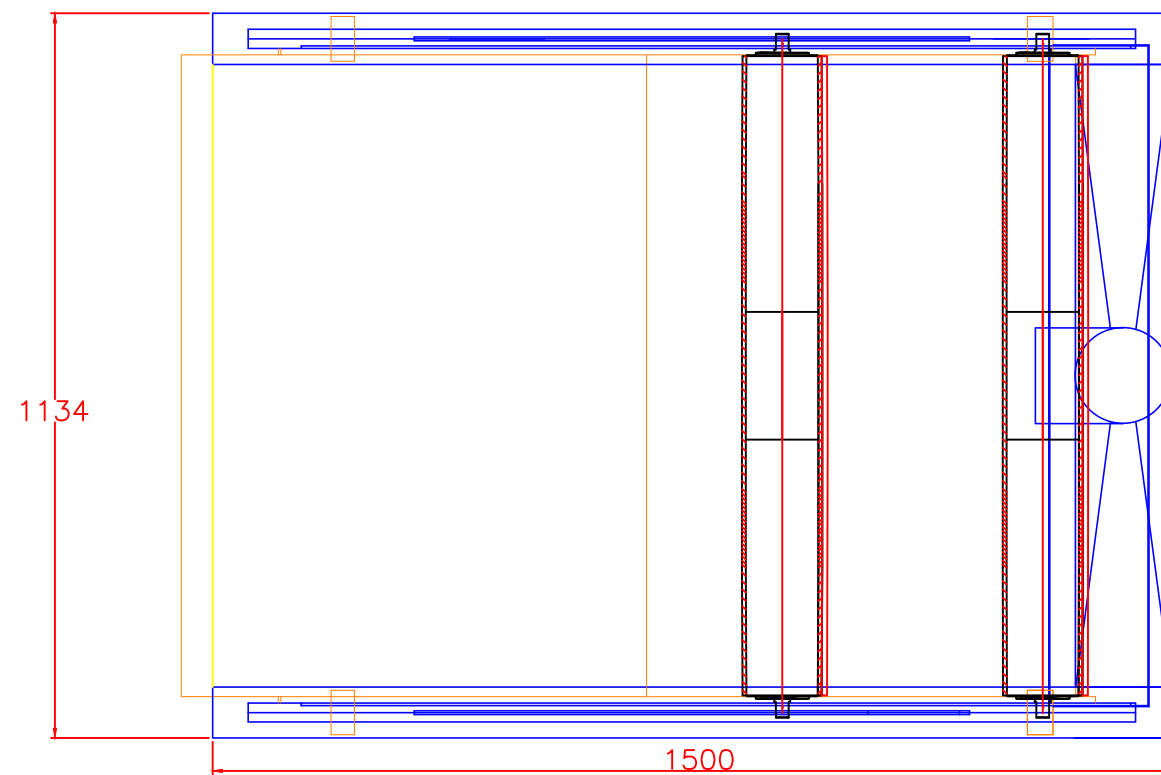
Adjustable for heeling in high seas

About the product Conveyor 1 and 2

The machine separates small fish and shrimp/prawns in a simple and effective way. It is based on the principle that fish and shellfish stick to the conveyor belt in different ways. The conveyor belts within the separator travel at much higher speeds than regular conveyor belts. The speed is adjustable, and different speeds are used depending on the species of fish mixed in with the shrimp catch.

Usually, conveyor 1 is made to go faster than conveyor 2. The incline is also adjustable. By using different inclines and speeds, the species are separated.

The ones which easily attach themselves (small fish) are conveyed up and then fall down into a collecting vessel, whereas the ones offering less friction (shrimp/prawns) slide back down the conveyor belt.



Intech International a/s Erhvervsparken 16. 9700 Brønderslev Tlf 96467600 Fax 96467601	MÅL	DATO	Rev.
	1:12.5 A3h	09.08.18	A
BS-1000. EE Standard Bifangst Separator	TEGN.	LA	
	Ordrenr.-pos.nr.-tegn.nr.		
			2018061-2