

Annual Meeting February 11th 2016



Safety design criterias of working stations traps hauler and supporting rack onboard lobster boats:

codevelopment with lobstermen, at-sea trials
and implementation strategies



OUTLINE

- Research program reminder/knowledge translation
- 2015 At-Sea trials
 - Process and methodology
 - Tested devices-prototypes
- Preliminary results and basic design cues
 - Traps trawl racks
 - Haulers
 - Rope separator panels
- Knowledge translation and uptake of research:
 - Applicability versus lobster boats and equipment heterogeneity: impact on the scope of the study
 - Acceptability; feasibility
- Follow up



The background of the slide is a solid blue color with a gradient. At the top, there are several wavy, horizontal lines in shades of blue and cyan, creating a layered, water-like effect. The main body of the slide is a uniform medium blue.

Reminder

Earlier Stages

Research Schedule

Stage 1

- To analyze the risks of and determining factors in overboard falls in lobster fishing
- To document collective and individual prevention solutions that can be adapted to lobster boats (Gaspé peninsula and Magdalen Islands regions)
- To identify, with lobstermen, the most promising risk reduction scenarios

Stage 2

- To test and implement the solutions adopted

At-Sea trials 2015 Fishing Season

Gaspé peninsula and Magdalen Islands Regions

Lobster Boats Selection

- Based on 20 lobster boats documented fishing process activity w/ «Observer software»
- Recruitment based on CERUL ethical rules
- Six lobster boats screening (See criterias in the right-hand box) :
 - **More heterogeneity** in Gaspé lobster boats and equipment (G)/Archipelago' ones (I) : thus 2 At-Sea trials in G; 1 in the Magdalen's
- Prefeasability meetings
 - To show and discuss different options: possible adjustments
 - Crews selection-final decision, several conditions to fill
 - nature and representativeness of the proposed improvements, openness, interest, motivation, involvement in design, availability, risk sharing agreement
- Conclusion
 - Gaspé (4) : Michael II : **Timmy Shawn**; Joey Jolianne; **Lobster boat A**
 - Maggies (2) : Guillemot; **Pascal Francis**

Poste-Critères	Cote	Commentaires
Haleur - Potentiel d'amélioration de la sécurité		
Support-casiers - Potentiel d'amélioration de la sécurité		
Haleur - Potentiel d'amélioration de l'efficacité		
Support-casiers - Potentiel d'amélioration de l'efficacité		
Haleur - Facilité d'implantation technique		
Support-casiers - Facilité d'implantation technique		
Haleur - Acceptabilité du changement (équiper)		
Support-casiers - Acceptabilité du changement (équiper)		
Haleur - Potentiel de valorisation & d'impact		
Support-casiers - Potentiel de valorisation & d'impact		
Faisabilité globale Total des points		

Project framework:

Suitable elements to fall overboard prevention and ergonomics

- Remove the rope close to the fishermen feet
- Raise the bulwark height to the hauler workstation
- Increase the height of the fisher's hand grip on the trap bridle
- Remote fisherman from bulwark:
- Lobster traps supported by boat structure
- Maximum use of the hydraulic power of hauler



For each boat-methodology (1)

Proposal from the research team to each selected crew

- Current status and potential for improvement
- Goal of modifications
- Technical Specifications
- Responsibility sharing agreement with Merinov
- **Hypotheses and concepts-validation by the expert committee April 17th 2015**
 - Members: Gaspé and Maggies crews + research team (engineer, engineering technicians , ergonomists, fishing experts)
- **Design : back & forth process among captains-tools and equipment welding workshops- research team**



For each boat-methodology (2)

- **Manufacturing-installation: Merinov' technical team + crew members + machining workshops**
 - **N.B. : Frequent adjustments were made over the use of equipment at-sea, most often in the presence of the research team'observers**
- **At-Sea procedures:**
 - **Before lobster boat modifications**
 - **After: 2 or 3 fishing days during first week and one more day later, about 3-4 weeks, following the crew adaptation stage.**
- **Results analysis (video clips, interviews, logbook, synthesis report)**
- **Validation of results in expert committee December 5th, 2015**

Both lobster traps racks prototypes with rope's receptacle

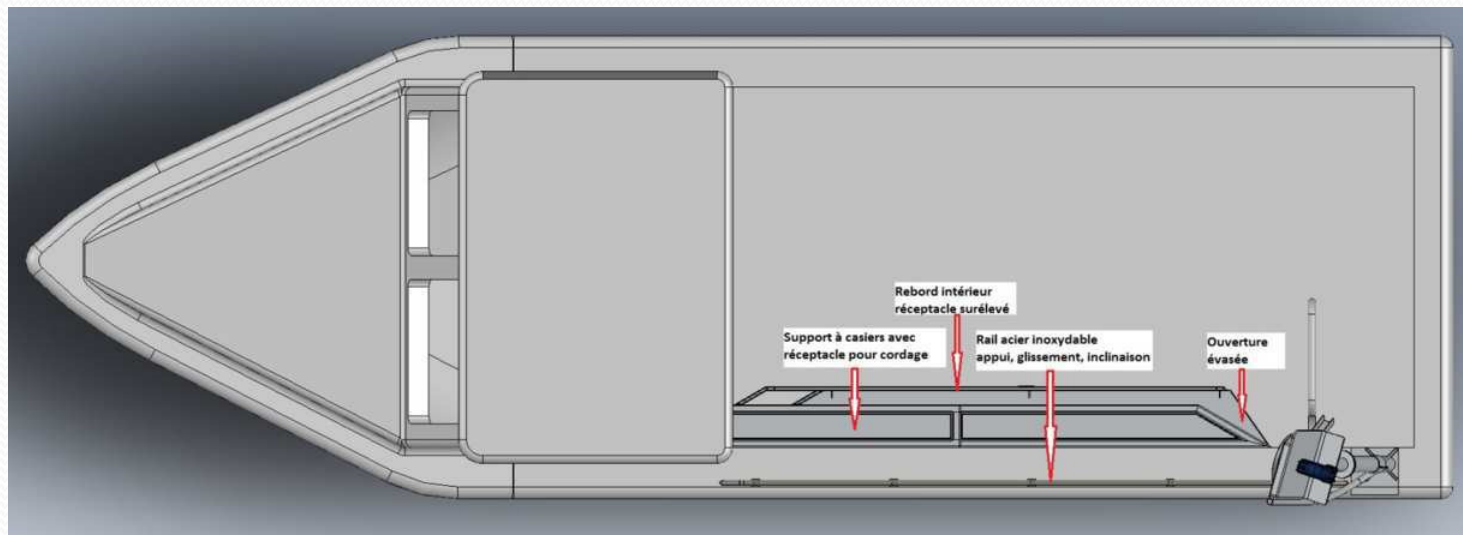
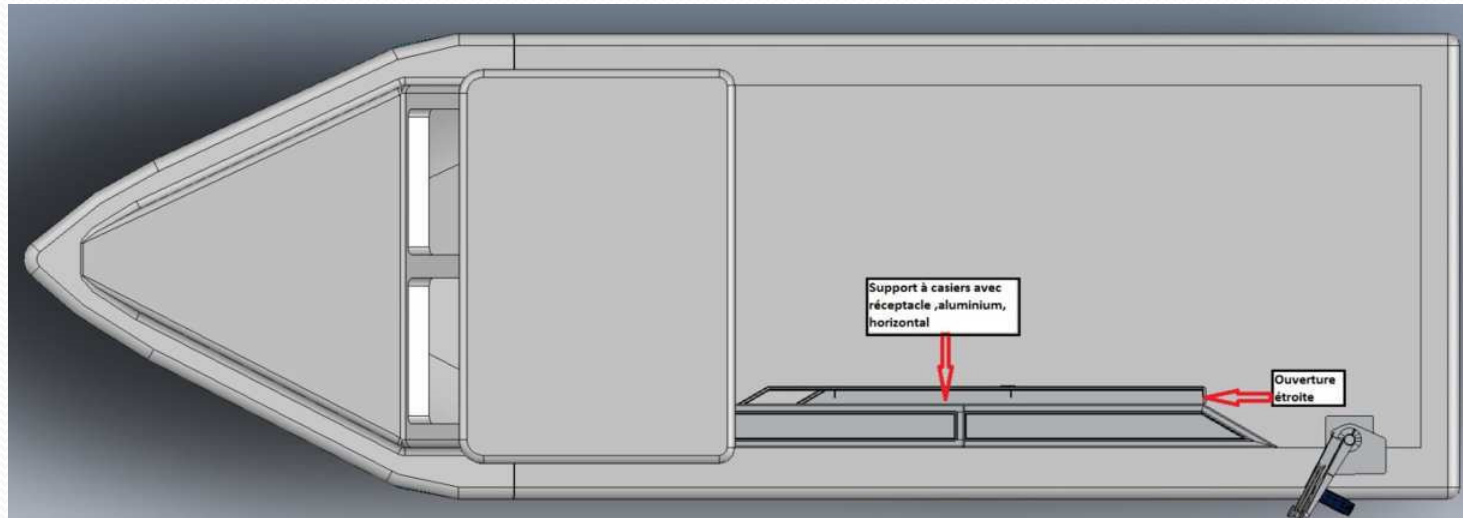
Customized gunwale, permanently secured: Gaspé
Table support, removable: Magdalen Islands

Customized gunwale traps rack with rope's receptacle Inspired from a currently used device



NB : In 2012 et 2013 : Among 18 lobster boats on board observations, one third (6) of all crew already put the ropes (bridles, gangion & sink lines) on their rack. Δ It was an existing prudent practice!

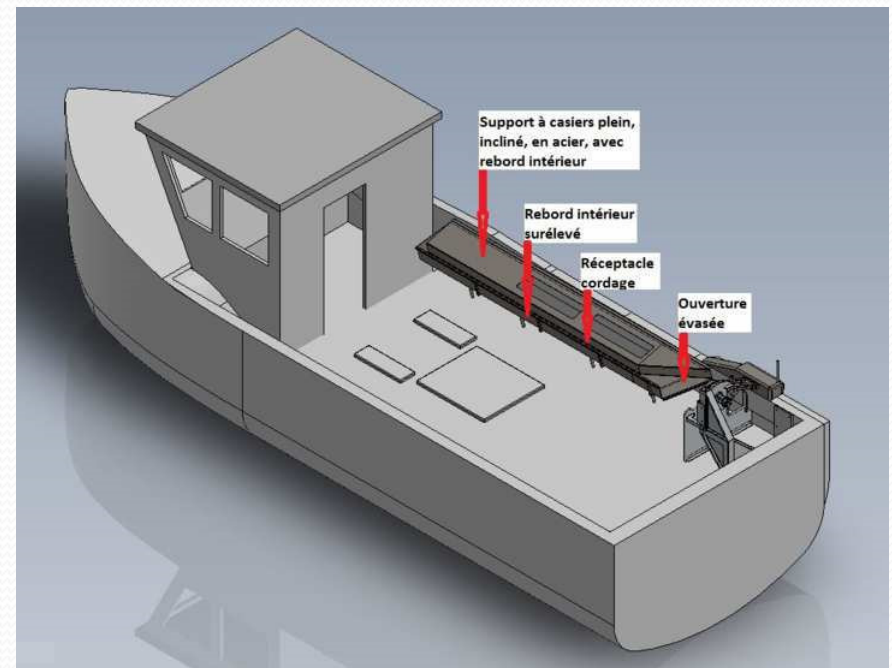
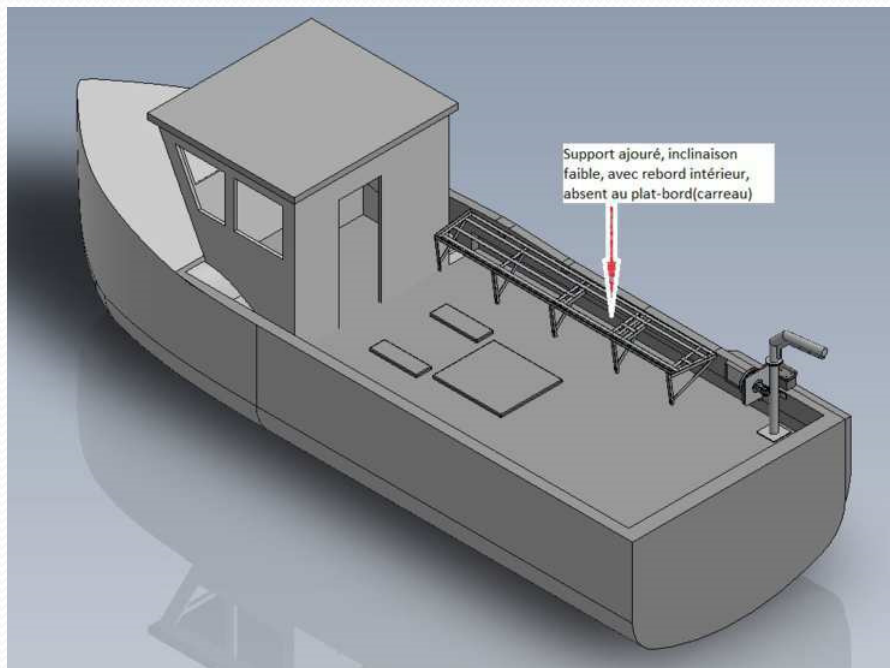
Customized gunwale traps rack with rope's receptacle/ Timmy Shawn: before - after



Customized gunwale traps rack with rope's receptacle/ Timmy Shawn: after



Lobster traps table support with rope receptacle / Pascal Francis: before - after



Lobster traps table support with rope receptacle / Pascal Francis: before-after



Before



After



Lobster traps racks prototypes with rope's receptacle:

In operation

Travail sur le nouveau support #1

Montage vidéo

Travail sur support et jeterV2 (T = 1:59 minutes)

Impacts of technical modifications



- No ropes on deck (in front of the rack)
- Better traps stability
- Improved ergonomics (more efficient posture with the presence of the rope separator panel, NB: To see later)





Some design cues trap trawls rack with rope's receptacle

- Rope's receptacle
- Splayed shape of the receptacle to its entrance
- Support height
- Tilt
- Width
- Shape (according to the one of each bulwark)
- Etc.

Both haulers prototypes

High tilted hauler: Gaspé

Low hauler far-off bullwark: Magadalen's

High tilted haulers: references



High tilted haulers/ Timmy Shawn : before- after



High tilted hauler: In operation

Remontée
Avant modification

Montage vidéo

- Analyse du haleur (T = 1:27)

Real-work ergonomics: Impacts on posture & efforts



Impacts of technical modifications



- Less leaning to catch lobster traps
- Greater use of the hauler power = much less effort
- Hauler design shall be improve



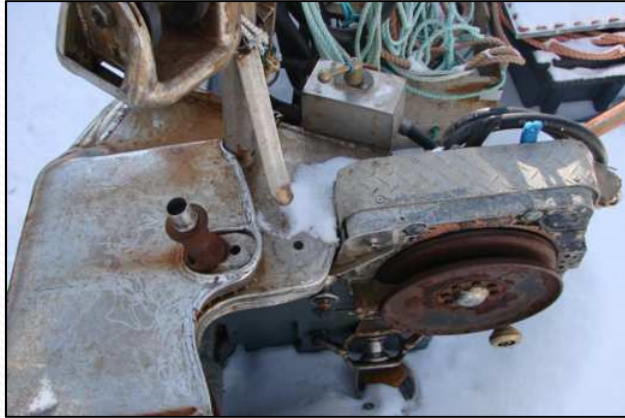


Some design cues

High tilted hauler

- Lift mast angle
- Back plates angle
- Lift mast rotation angle
- Height
- Etc.

Low hauler far-off bullwark: references



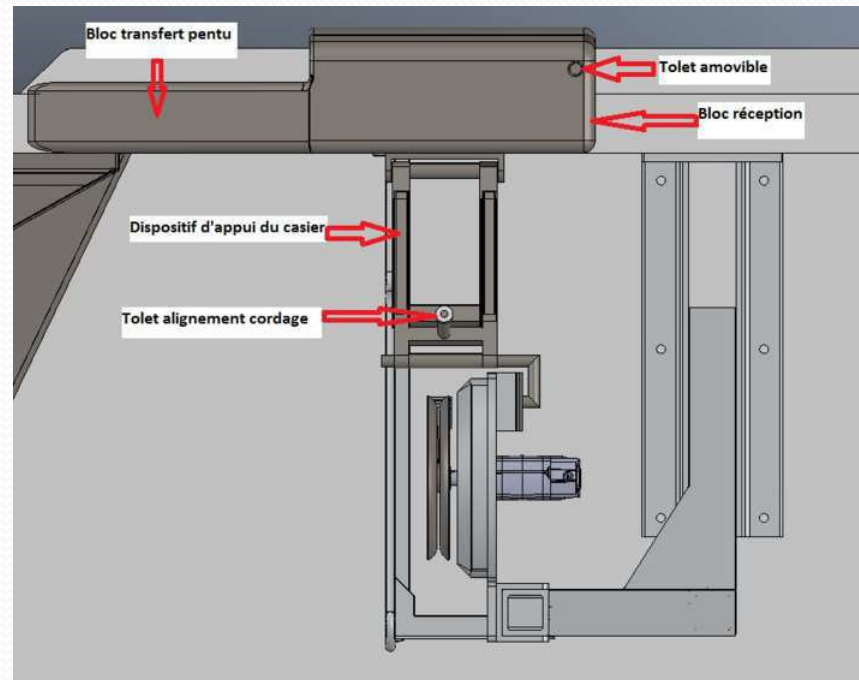
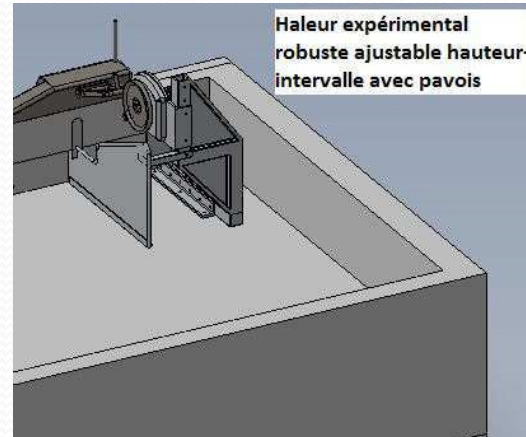
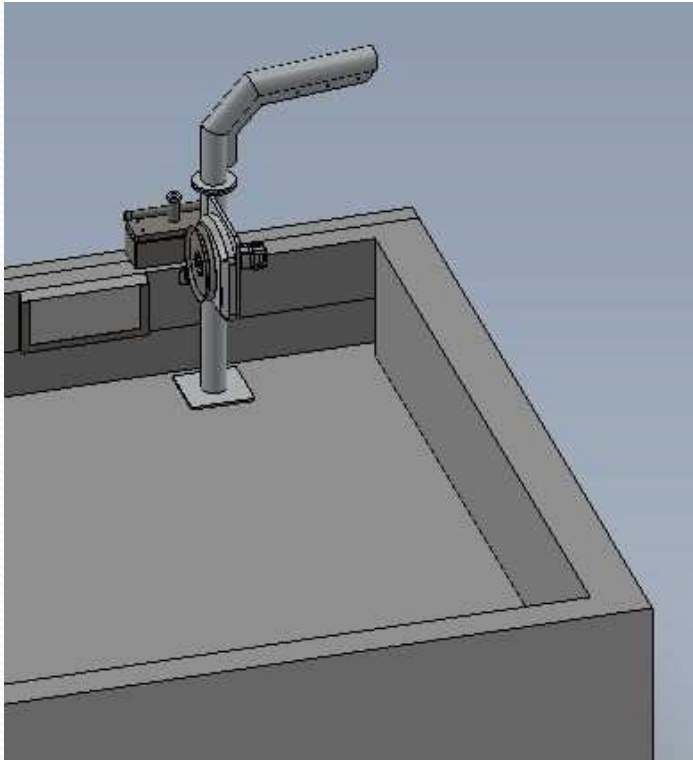
Lobster fishing
boat-Anticosti
Island



Developped by a Magdalen Islander's
captain



Low hauler far-off bullwark/ Pascal Francis: before - after



Low hauler far-off bullwark



Hauler before

Hauler setted



Low hauler far-off bullwark: In operation

Avant modification

Montage vidéo
Haleur avant – après V_2 ($T = 1:42$ min)

Real-work ergonomics: Impacts on posture & efforts



Before



After



Impacts of technical modifications



- Less leaning to catch lobster traps
- Greater use of the hauler power = much less effort



- Real opportunity to significantly raise the gunwale





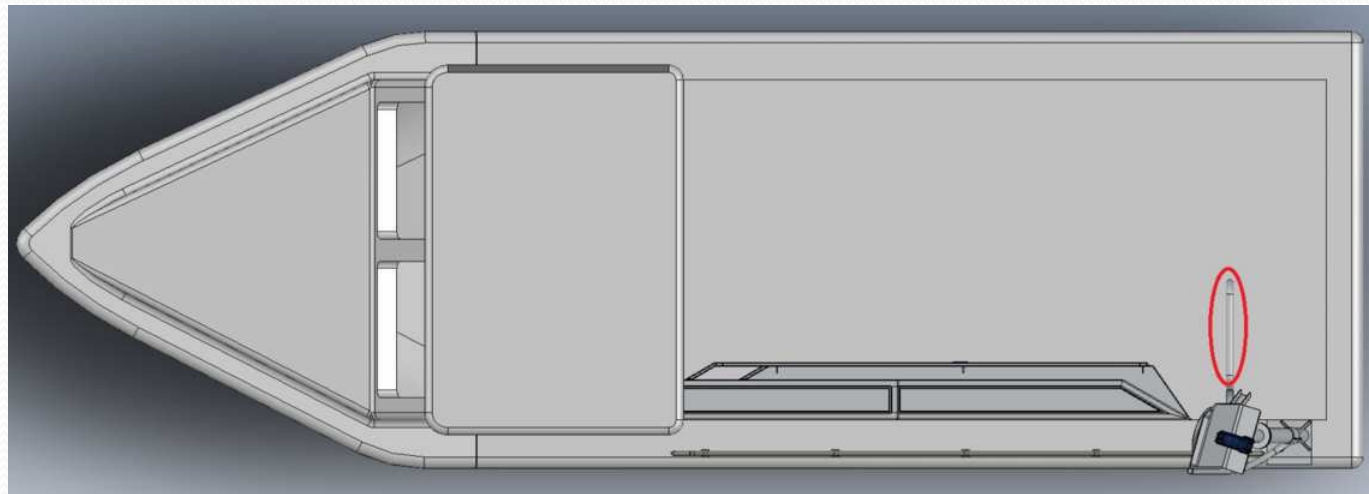
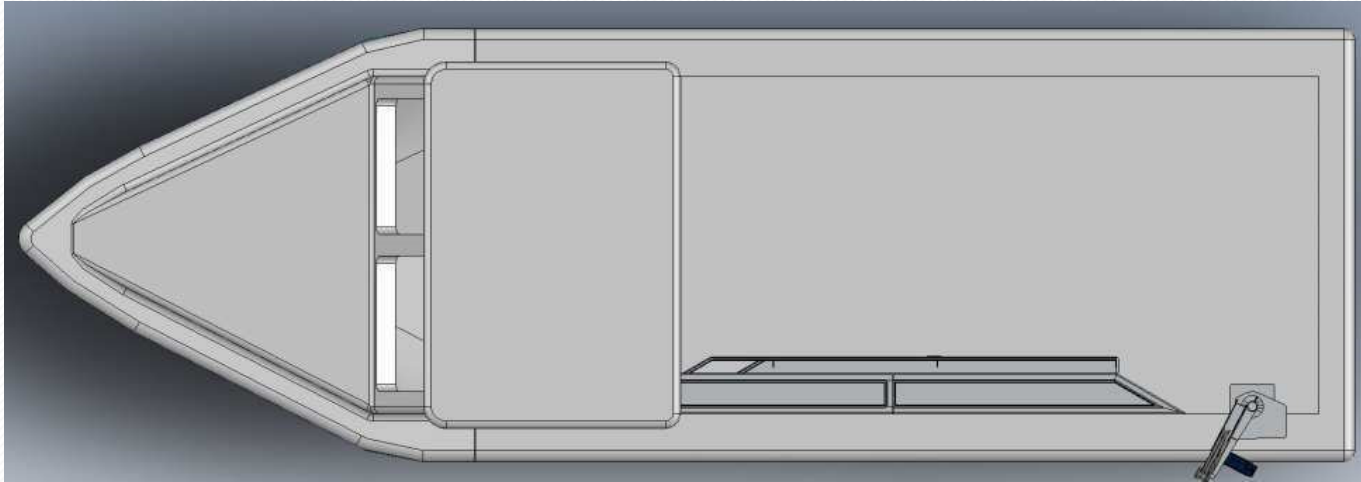
Some design cues

Low hauler far-off bullwark

- Capability to board the trap on a holding device
- Raised gunwale height: a long block , rounded, sloping toward traps rack
- Narrow deck footprint
- Allow to work in front and behind the frame
- Sturdy guiding rope thole
- Minimize friction on the ship's side
- Avoid rough edges

Rope panel divider prototypes

Rope panel divider / Timmy Shawn: before-after



Rope panel divider /Timmy Shawn



Rope panel divider : In operation

Cordage au pied de l'ancien haleur
Avec nouveau support

Montage vidéo (Timmy Shawn)
Contrôle cordage pied haleur (T = 1:32 min)

Impacts of technical modifications



Among the crews of two of the three ones, most lobstermen say they never want to remove the panel divider

- Less restricted and more stable posture
- Risk reduction of fisher entanglement if a part or all of the trawls go back accidentally to the water while hauling the traps



Design cues: Rope panel divider



- Shape
- Frame well fixed to deck and bulwark
- Space to the hauler frame
- Enhance rope guide to the hauler sheave outlet

Knowledge translation

Applicability
Acceptability
Feasibility



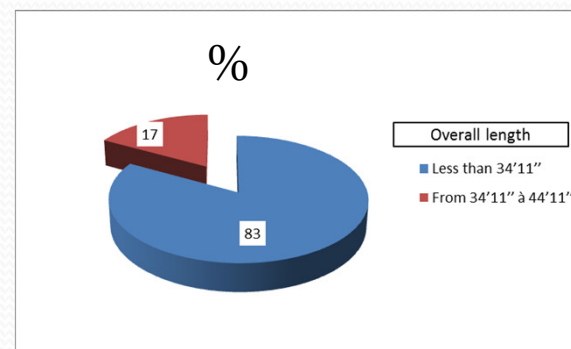
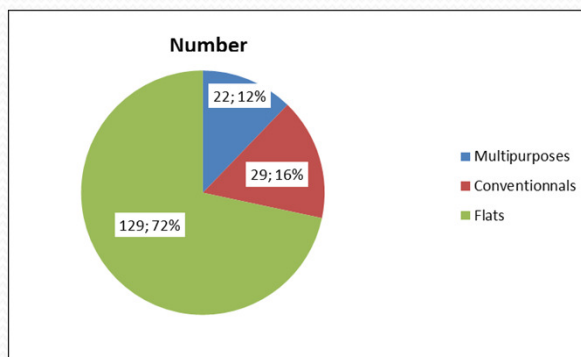
Devices prototypes tested

- It is unthinkable to set solutions that are universally applicable.

Too numerous factors of variability:

- Types and specific shape (curvature of the bulwark rail, height of the bulwark; width of the gunwale or tile) of lobster boats
- Fishing boats facilities
 - Workspaces on deck
 - Clearance around the hauler working station
- The fishing conditions
 - The fishing zone (water depth, distance from the harbour, sea surface roughness, trawls hooking on bottom, tension on the ropes or gaff)
- Variability confirmed in 2012 and 2013 surveys

Lobster boats in Gaspé peninsula 2013



Haulers Gaspé 2012-13



Photos 4 a et b. Le haleur pivotant orientable selon l'angle d'arrivée du cordage de la Gaspésie.



Photo 6. Le haleur fixe à potence et poulie observé en Gaspésie.

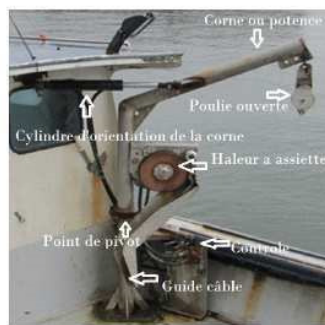
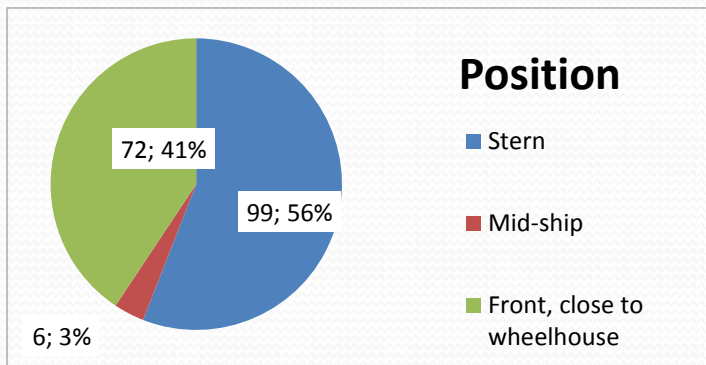
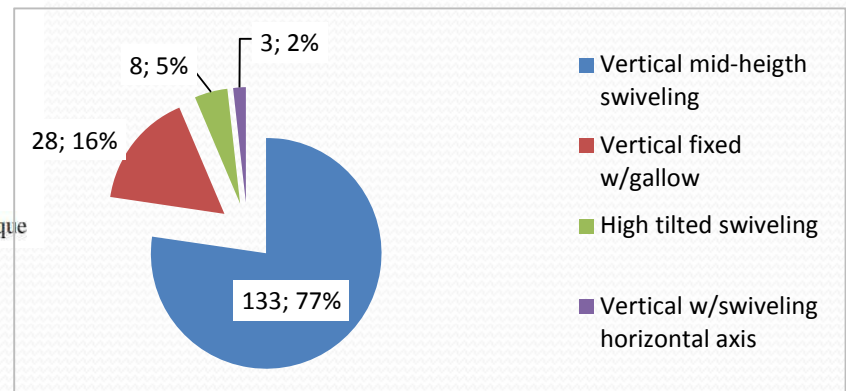


Photo 7. Haleur fixe à potence avec assistance hydraulique



Photo 5. Le haleur pivotant incliné

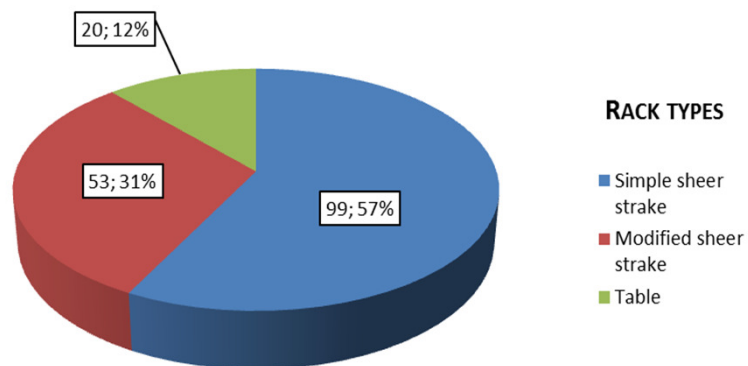


Starboard: 105 (58 %)
Port: 77 (42 %)

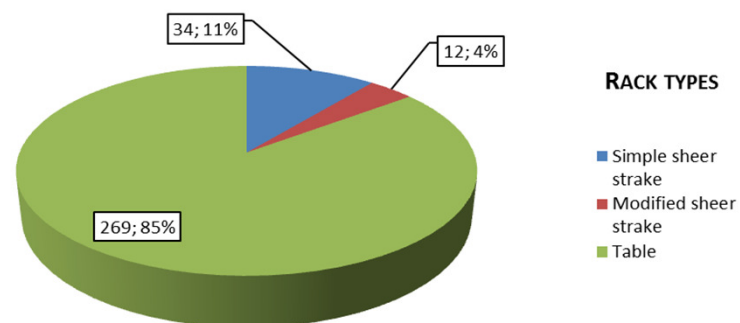
Lobster traps rack

Regional Fisheries Data

GASPÉ



MAGDALEN ISLANDS



Haulers prototypes: Applicability

- Expert perception
 - Low hauler far-off bullwark (Magdalen Islands prototype) should be usable on some Gaspé lobster boats
 - One of the Islanders' captain do not think that High tilted hauler (tested in Gaspé) could be usable in their lobster fishing area.
 - There is a consensus on the need to modify or adapt the trawls assemblage when changing hauler since their mounting directly affects the efficiency of the hauler
- Research team perception
 - They consider the applicability of both types of haulers depends on lobster boat categories rather than regions.
 - Although the High tilted hauler, installed near the wheelhouse, is observed on some lobster boat in the Gaspé, it remains to establish safety design cues, ergonomics and efficiency for this equipment.

Knowledge translation

The acceptability and feasibility analysis by the captains and the research team as well as a potential strategy to implement these design cues will be described deeper in the report

The facilities tested:

impact on falls overboard prevention and real-work fishing ergonomics

- Customized gunwale traps rack with rope's receptacle
 - A way to eliminate the rope on the deck during trawls catch and release
- High tilted hauler
 - Allow to raise the traps higher while freeing workspace in front of the fisher
 - Worker less lean over bulwark and facing traps to set them easily on the sheer strake
 - Allow the installation of a higher sheer strake
 - Better use of hauler power ⇒ effort lessening

The facilities tested:

impact on falls overboard prevention and real-work fishing ergonomics

- Hauler far-off bulwark

- Under the action of the hauler, traps round the gunwale (sheer strake) and there embarks on much of its length

- The fisherman is away from the bulwark
 - Allow the installation of a higher sheer strake=transition zone toward traps rack
 - Effort significantly reduce; Maximum use of hauler power

- Rope panel divider-Innovation

- A way to eliminate rope on deck during trawls catch and release

- Less risk to be entangle if a line (or a part) drops accidentally into the seawater
 - Improved posture and stability⇒ Allow fishers to work with feet flat and better planted on the deck⇒ Lesser loss of balance; Reducing musculoskeletal stresses: heavy lobster traps handling

- Annual meeting February 11th 2016



Thank you
to all our partners
And
for your attention!

