TVM

TRAWL VISION MOBILE

Powered by

acrux SOFT

Trawl Vision Mobile

The following application is aimed at fishermen, students and engineers involved in fishing activities, in order to contribute to improve the efficiency of fishing gear and the contribution of knowledge for the long-term preservation of natural resources.

Trawl Vision Mobile | The company

Since 2000, AcruxSoft has been developing technological tools and professional services that contribute to the improvement of fishing activities worldwide.

Its objective is to provide knowledge for the preservation of natural resources, based on a fisheries ecosystem approach.

www.acruxsoft.net – info@acruxsoft.com.uy

TVM | TRAWL VISION MOBILE

Trawl Vision Mobile | Why is TVM necessary?

The Sofia FAO report (2018 & 2020) states that 75% to 80 % of the global fishing catch is made by trawl fishing.

Trawl fishing creates jobs, helps the development of national economies and provides food safety for many families.

Because fuel prices continue to increase there has been a steep increase in production costs.

Therefore, a first priority is the creation and development of technological tools easily accessible to all members of the fishing communities, a process that must be focused on getting better trawling systems with lower production costs and sustainable use of natural resources.

Contents

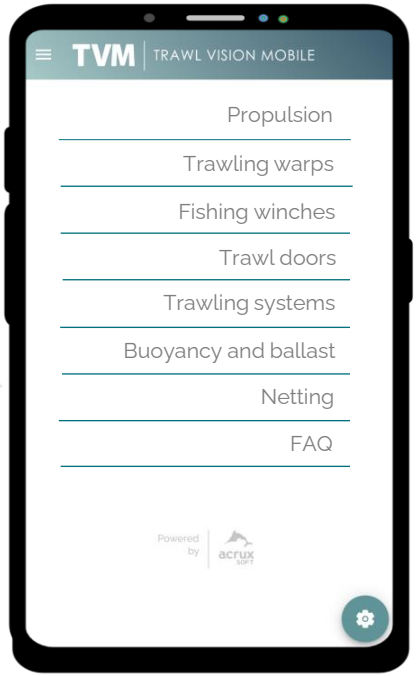
- The application brings together mathematical algorithms and information with records of successful empirical evidence, obtained by international fisheries experts based on research campaigns on the performance of different fishing trawls.

- The system was created to be used in a practical and intuitive way to support fishermen, fishermen and scientists in their daily decisions.

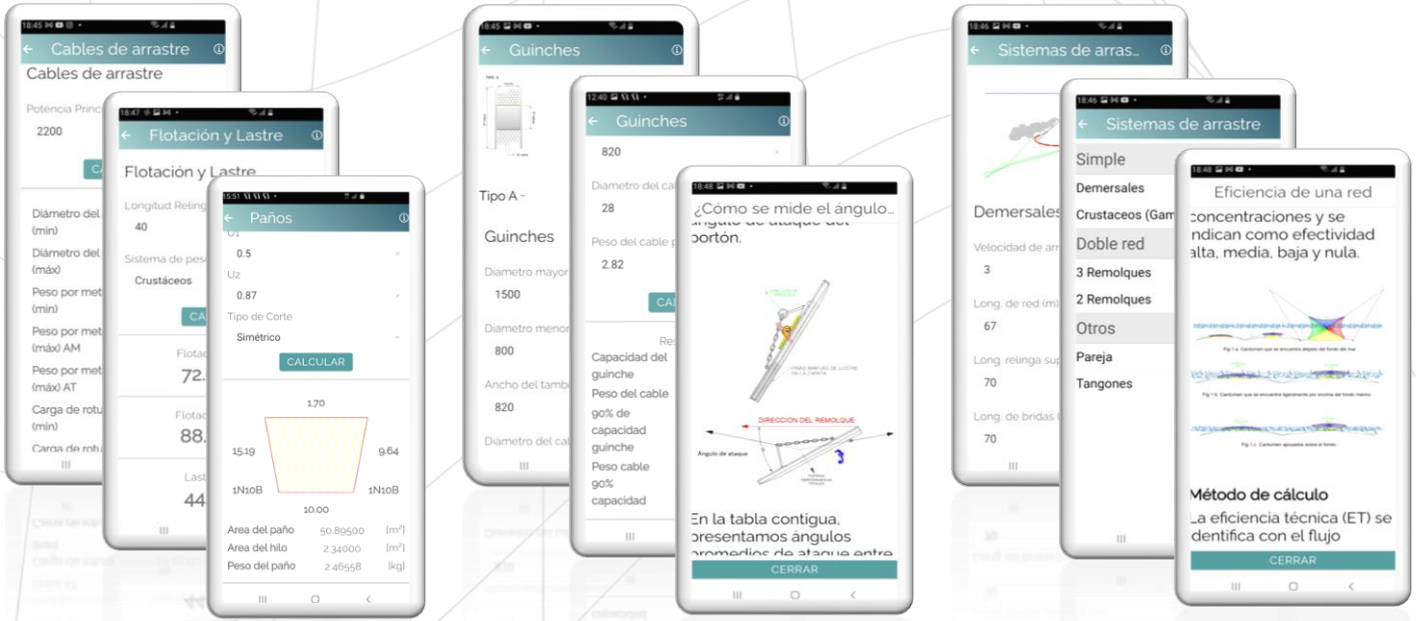
- The programming language used is world class. This allows us to add content and updates remotely, without the need for the user to reinstall the app.

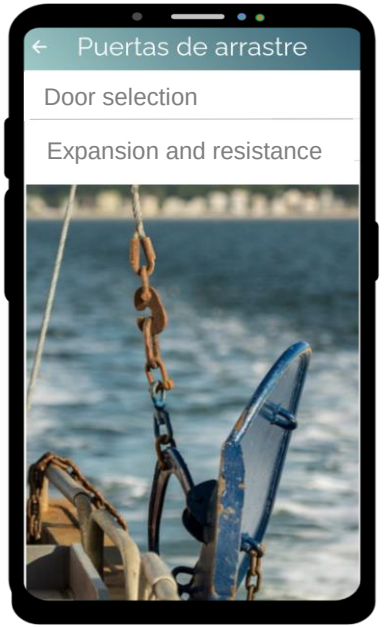
TVM – Main menu

The system contains algorithms to evaluate and diagnose the fishing gear. It presents practical solutions and updated didactic procedures on: propulsion, deployment, angles of attack, selection and calibration of the otter doors, selection and types of warps, winches, buoyancy calculations, ballast, weight, area, tapering of the panels, mesh opening coefficients (U_1 and U_2), codends, technical efficiency, types of meshes, among others...



TVM - All the data you need, under your fingertips…





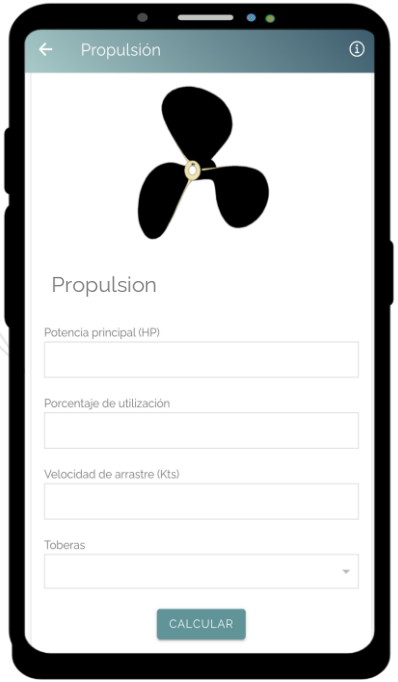
AcruxSoft

TVM | TRAWL VISION MOBILE

TVM – Propulsion

The function allows to calculate the total thrust force of the vessel and the tension in the trawl cables according to its characteristics...

It is essential to know the real thrust of the vessel, in order to know how to distribute our energy resources within the trawl system in an intelligent way.



TVM – Trawling warps

The application presents a new and practical methodology which allows selecting and comparing different types of trawl warps through calculations and empirical information.

By entering the vessel's power, we can calculate the minimum and maximum ranges used in the international industry: diameters, weight per meter, steel core, textile core, breaking load and compare it with the latest successful empirical records of the international fishing fleet.

TVM – Trawling warps | Information

By clicking on the **Information icon**, you can access the latest news about the various materials, advantages and selection criteria.

The information contains, the most used trawling warps in the world with their characteristics, durability, breaking load of stainless steel, galvanised steel and Dynemma rope.

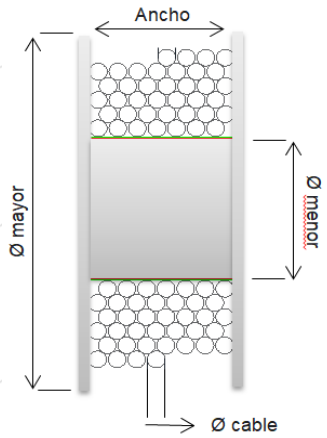
TVM – Fishing winch capacity

By feeding into the app the characteristics of the fishing gear winch and the warp it is possible to calculate the weight and length of the warp up to 90%-100% of the winch capacity.

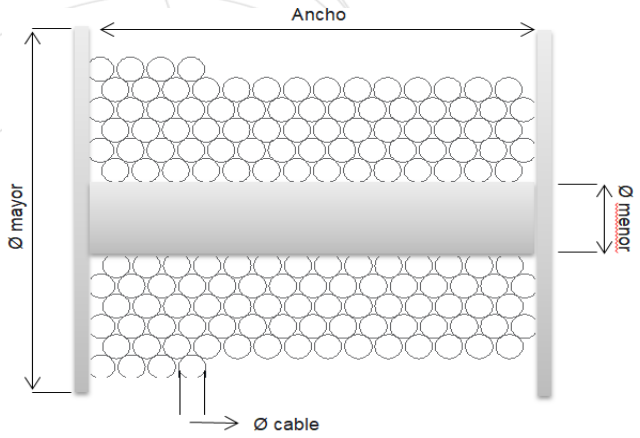
TVM – Fishing winches | Stowage drum forms

To perform the calculation we must first classify the shape of the winch stowage drum into type A or type B.

A



B



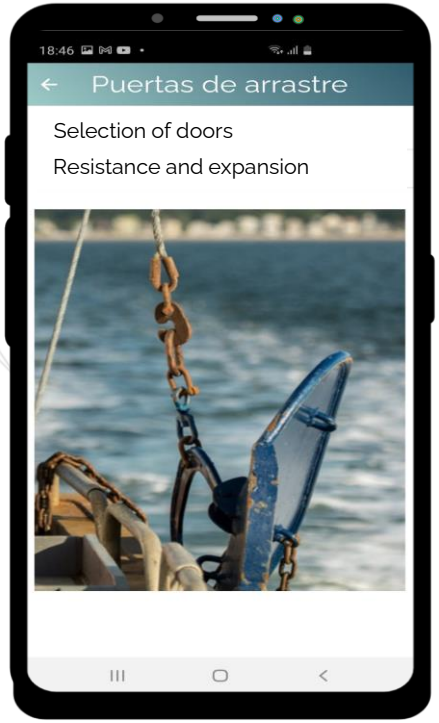
TVM – **Fishing winches | Results**

The results offer us the possibility **to estimate the necessary cost of the different types of warps** or sweeps, depending on the capacity and structural characteristics of the winch.

TVM – Otterboard

- Otterboard account for 25% of the energy consumption used and are responsible for keeping the trawl in the correct position and expanding our catching capacity.

- The APP calculates area, weight and door consumptions according to: vessel power, vessel type, trawling speed, fishing type and hydrodynamic properties of the doors (C_l and C_D). The results come from empirical records and mathematical functions.



TVM – Otterboards | Data entry and results

(i) Information and tips on otterboards (see more in FAQ).

Result of the mathematical function.

Results extracted from international fishing fleet referents, maximum and minimum ranges, depending on the input power.

TVM – TVM - Otterboards | Efficiency

How to select and measure the performance of the Otterboards?

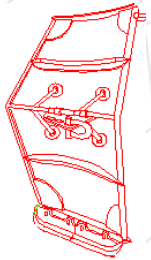
The results allow us to measure and select different types of otterboards according to their hydrodynamic properties, determined by their coefficients: lateral (CL), drag coefficient (CD), towing speed, area and type of water (salt or fresh).

TVM – Comparison result of trawl door spread

Example: we compare same areas and speed, with different hydrodynamic coefficients Cl, Cd.

Data entry

Area = 5 m².
Speed = 3 kts.
Cd = 0,89
Cl = 1,6

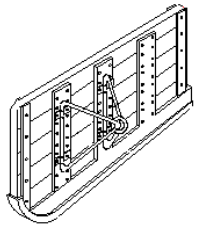


Results
Higher performance
Resistance force trawl doors = 534,00 kgf.
Trawl Doors spread force 993,72 kgf.

MORE DOOR SPREAD with lower consumption

Data entry

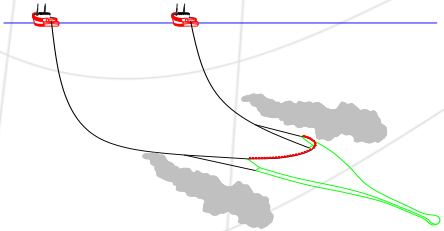
Area = 5 m².
Speed = 3 kts.
Cd = 0,87
Cl = 0,93

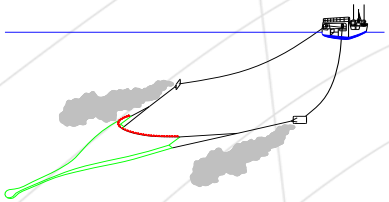


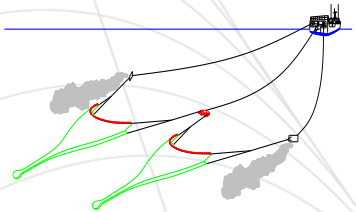
Results
Lower performance
Resistance force trawl doors = 577.60 kgf.
Trawl Doors spread force 540.33 kgf.

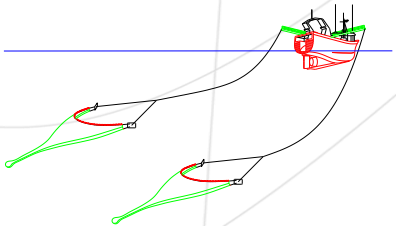
LESS DOOR SPREAD with more consumption

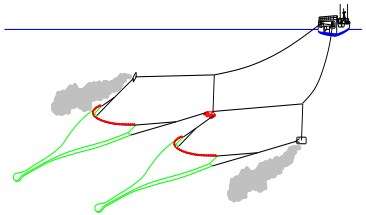
TVM – Trawling systems

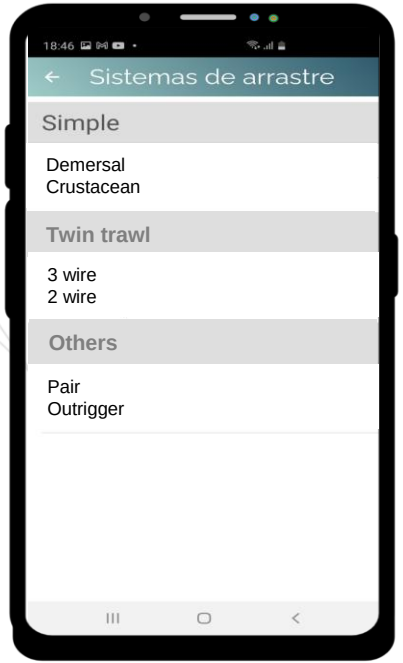




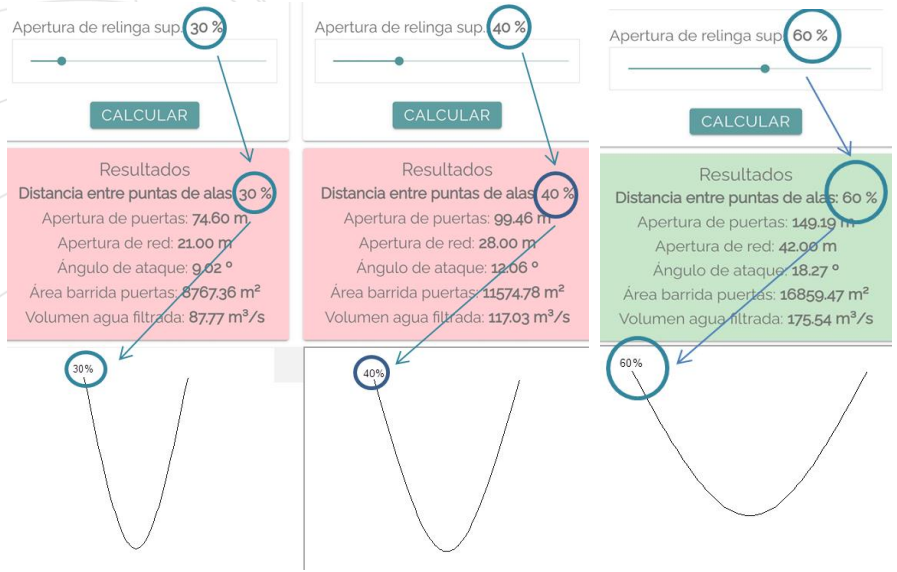








TVM – – Trawling systems | Data entry and results



TVM – Trawling systems | Results

The application offers the possibility to calculate, diagnose and correct the deployment of different systems for demersal and crustacean species.

Its results suggest and allow the calculation of: attack angles, net openings, gates and optimal headrope deployments.

Resultados

Distancia entre puntas de alas: 60 %

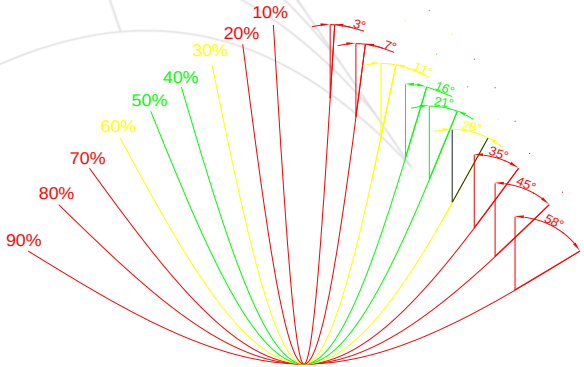
Apertura de puertas: **149.19 m**

Apertura de red: **42.00 m**

Ángulo de ataque: **18.27 °**

Área barrida puertas: **16859.47 m^2**

Volumen agua filtrada: **175.54 m^3/s**



TVM – Trawl systems | results and diagnostics

The application compares the results obtained with multiple records of successful rigs, identifying their level of efficiency with the following colors.

SUCCESSFUL

Resultados
Distancia entre puntas de alas: 60 %
Apertura de puertas: **149.19 m**
Apertura de red: **42.00 m**
Ángulo de ataque: **18.27 °**
Área barrida puertas: **16859.47 m²**
Volumen agua filtrada: **175.54 m³/s**

MEDIUM EFFICIENCY

Resultados
Distancia entre puntas de alas: 54 %
Apertura de puertas: **134.27 m**
Apertura de red: **37.80 m**
Ángulo de ataque: **16.38 °**
Área barrida puertas: **15329.76 m²**
Volumen agua filtrada: **157.99 m³/s**

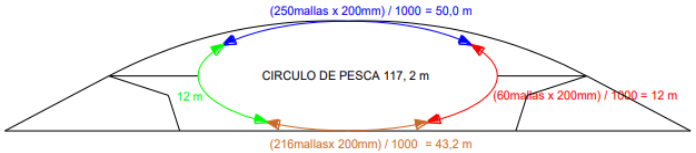
LOW EFFICIENCIY

Resultados
Distancia entre puntas de alas: 44 %
Apertura de puertas: **109.41 m**
Apertura de red: **30.80 m**
Ángulo de ataque: **13.29 °**
Área barrida puertas: **12671.08 m²**
Volumen agua filtrada: **128.73 m³/s**

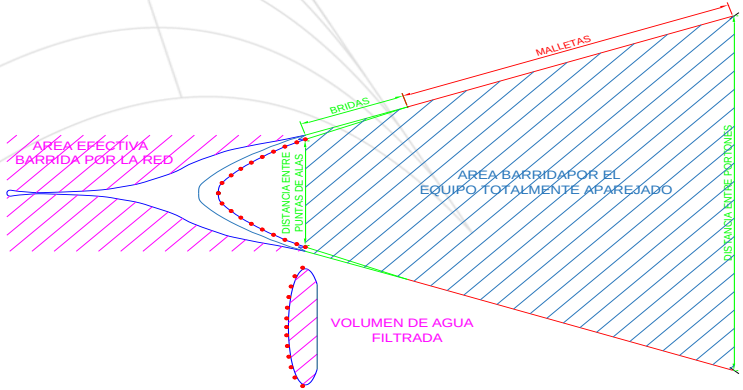
...

TVM – Trawl Systems | Technical Efficiency

The software allows to measure the technical efficiency through the volume of water filtered and area entrained from the otterboards, these parameters are fundamental to measure the magnitude or compare the productive capacity between trawls.



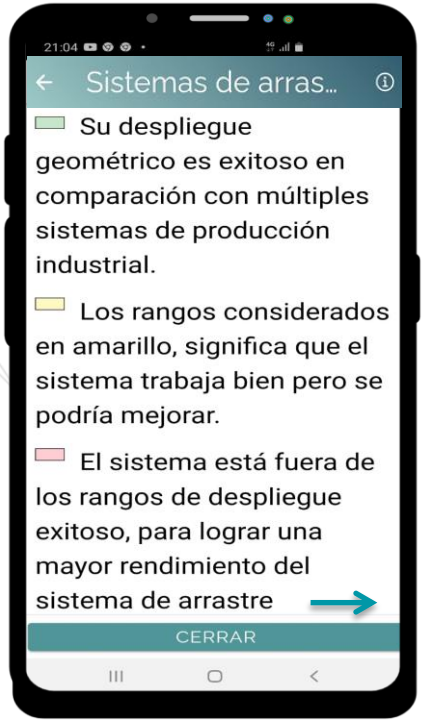
Filtered water volume 175,6 m^3/ seg.



Area dragged from the otterboards 15,600 m^2.

TVM – Drag System Diagnostics

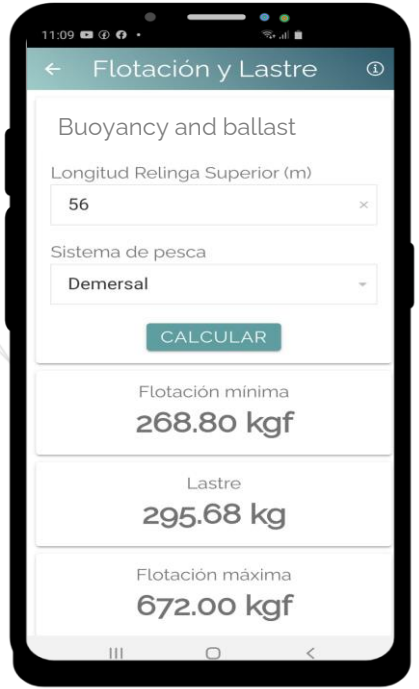
The application can diagnose the results and **suggest corrections based on successful experiences**, (press the information icon **(i)**, located at the top right of the screen).



TVM – Buoyancy and ballast

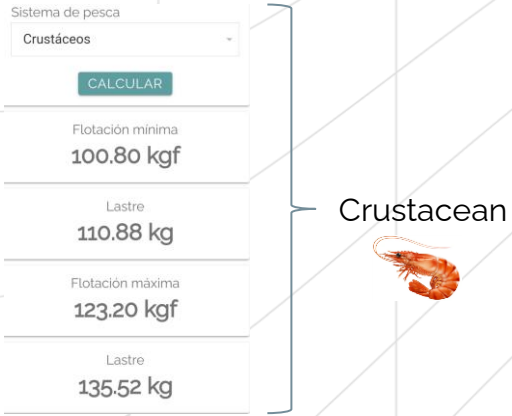
For the calculation of buoyancy and ballast we use a rational criterion based on **calculations, empirical data and information of the latest international trends.**

By clicking on the icon (i) you can receive suggestions from leading companies and information with reference **tables and different flotation modalities** (hydrodynamic and hydrostatic).



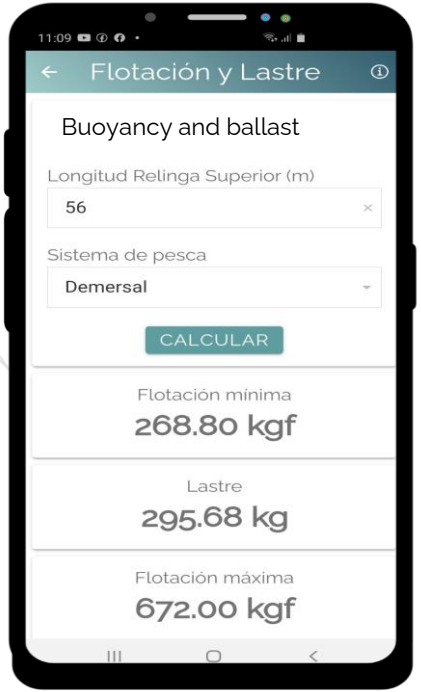
TVM – Buoyancy and ballast | Results

The application provides results with maximum and minimum ranges of buoyancy and ballast required for demersal and crustacean fisheries.



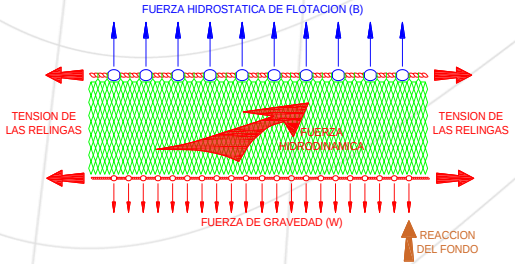
Crustacean

Demersal



TVM – Buoyancy and ballast | Updated information

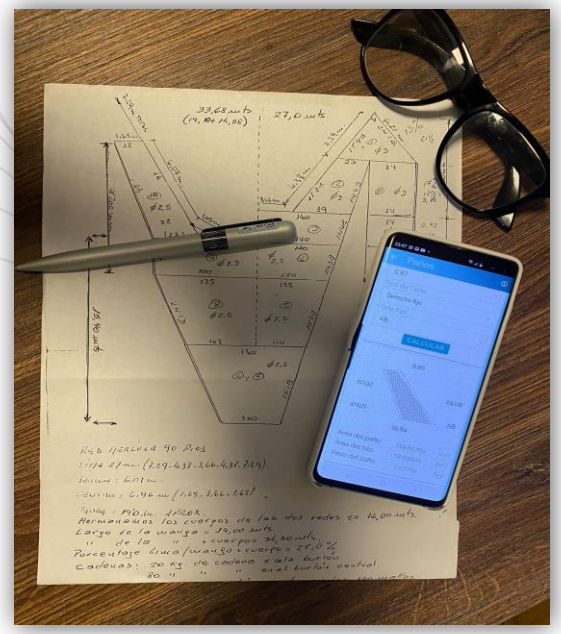
Through the **"Frequently Asked Questions"** in the **"How to improve buoyancy"** option, you will be able to access news about the different floats, reference tables, dimensions, benefits, disadvantages and suggestions.



REFERENCIA	TAMAÑO	FLOTABILIDAD	Profundidad trabajo	Profund. Maxima	AGUJERO ø	Fuerza impacto
N90/17A	200 mm	2.860 g	1.200 m	1700 m	21 mm	45 Kg
TITANIUM.20/20	200 mm	2.450 g	1.400 m	2.000 m	21 mm	60 Kg
N280/15A	280 mm	8.100 g	1.050 m	1.500 m	24 mm	55 Kg
TITANIUM.28/20	280 mm	7.110 g	1.400 m	2.000 m	24 mm	60 Kg

TVM – TrawlVisionMovile

AcruxSoft made it possible that from your mobile or cell phone, you can create section by netting section and correct in minutes your fishing trawl...



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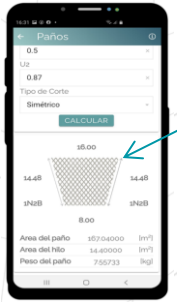
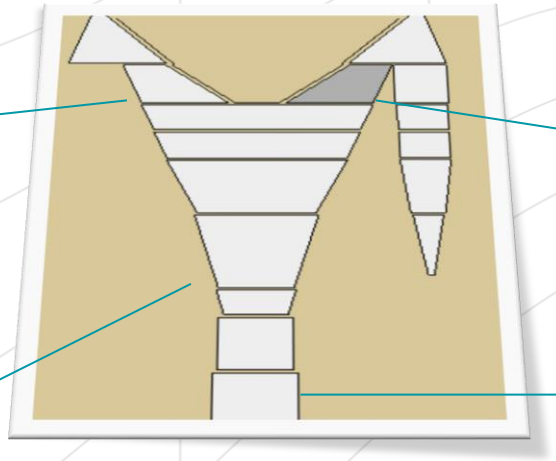
TVM - Netting | All results on your cell phone



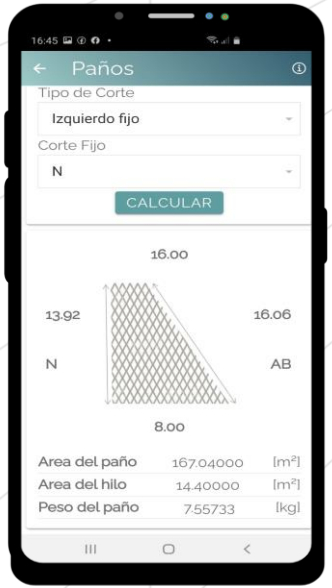


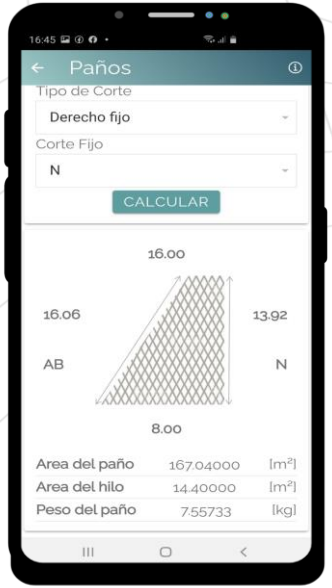
Cuts, length of ropes, weight of the panel, panel area, square and diamonds meshes ...

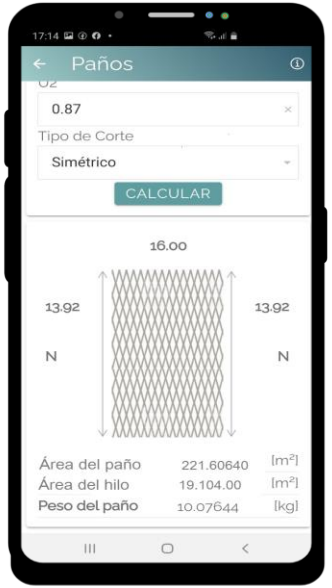
TVM - Netting | Data entry

The application gives us the possibility to calculate: symmetrical and asymmetrical cuts of the netting panels, codend design, calculate lengths of the sweeps sections, designs with square mesh, diamonds, netting weight, twine area, filtration (U_1 and U_2) and netting area.

TVM - Netting | All results on your cell phone







TVM - Netting | Resultados

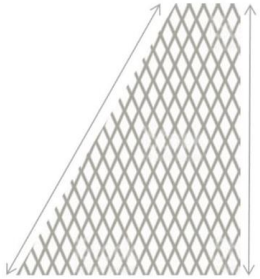
Length in meters of the right-hand side panel as a function of the number of meshes x mesh sizes vertical opening coefficient (U2) and angle of taper.

16.06

Left netting taper.

AB

To access the mode of use of the taper, press the information **icon (i)**.



16.00

Length in meters of the upper panel as a function of the number of meshes x mesh size x horizontal opening coefficient (U1).

13.92

Length in meters of the right-hand side panel as a function of the number of meshes x mesh sizes vertical opening coefficient (U2) and angle of taper.

N

Right netting taper.

8.00

Length in meters of the bottom panel, as a function of the number of meshes x mesh size x horizontal opening coefficient (U1).

Panel area	67.04(	[m²]
Twine area	14.40(	[m²]
Weight panel	7.55;	[kg]

The weight of the netting section is a function of the dimensions entered and **runnage** or **performance** of the netting (m/kg).

TVM - Netting | FAO Units and Nomenclatures

Runnage - Most material catalogs display this very useful information that indicates the amount of yarn, in meters/kilogram. In this software, Meters/Kilograms can be used to calculate the weight per panel. Through these results, we can know in more detail the properties of the yarn, unify or distribute weights within the trawl and make a precise calculation of the amount of yarn needed for the construction of the trawl.

• **U1** is equal to the working percentage of the transverse axis of the trawl, perpendicular to the direction of the trawl axis.

• **U2** is equal to the longitudinal working percentage of the mesh which determines the length of the trawl during the unfolding of the panels.

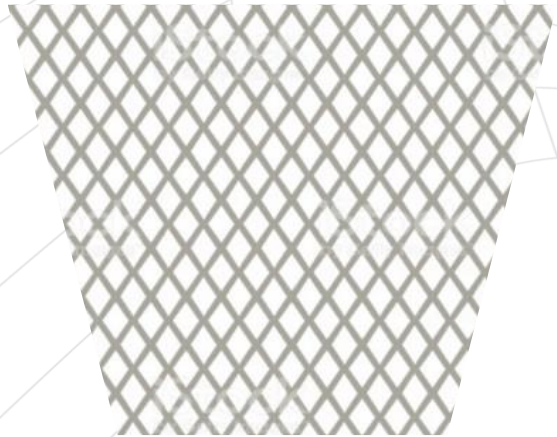
Twine diameter: diameter of the twine in millimeters.

Mesh length: stretched mesh length in millimeters.

TVM Panel | FAO units and nomenclatures

Number of upper meshes

Number of mesh height



Number of bottom meshes

TVM - Netting | FAO units and nomenclatures.

Property and method of defining tapering.

Panel taper are those that determine the angles of attack of the panel and their set that of the net, product of the number of top and bottom meshes and their length.

The panel taper are defined as N, B and T, according to FAO terminology (1N2B, 1T3B, AB...).

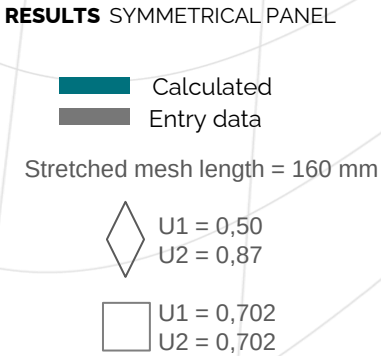
To calculate the tapering of a panel we must first define the panel:

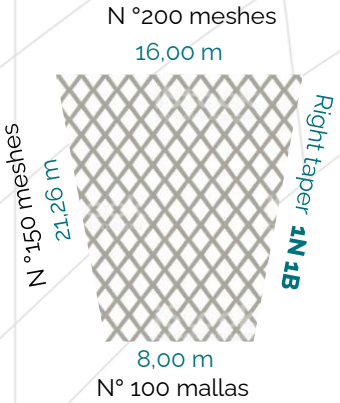
a) SYMMETRIC.
b) ASYMMETRIC.

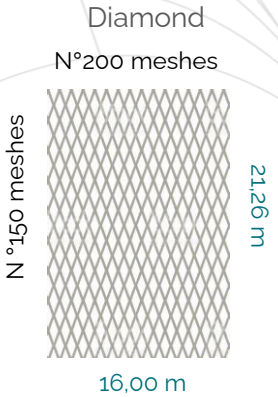
TVM Netting | Taper and types of meshes

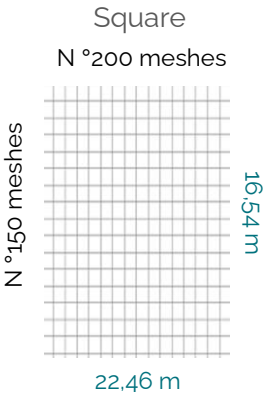
Symmetric panel

The taper are the same on both sides of the panel and are modified depending on the change in the number of meshes.
Symmetrical panels are used to define the belly, square, codend...
The user will determine the type of square or diamond mesh, the graphics are merely illustrative.









TVM Panel | Calculate an asymmetric panel

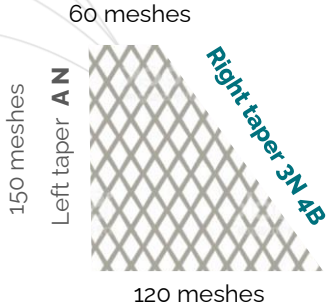
Asymmetric panel
To define an asymmetric panel, we must first assign a taper to the left or right side of the panel, (example: 1N2B, 1N2T, AB), then the application will calculate the other panel taper based on the number of meshes entered.

Identification of the taper
LEFT, are located on the left side of the screen.
RIGHT are on the right side of the screen.

EXAMPLE ASYMMETRIC PANEL

Taper entered by the user.

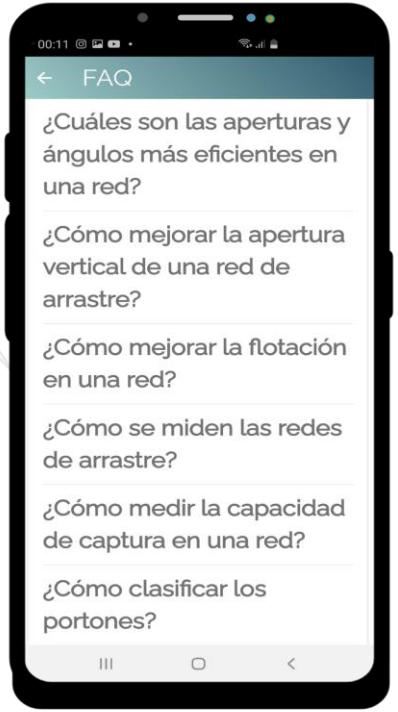
Taper calculated by the software.



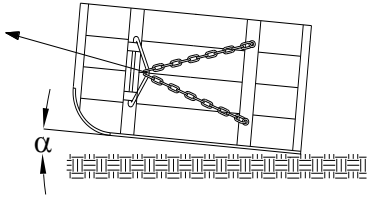
Note: The application calculates the length of each side of the panel, based on the taper x number of meshes x the length of the mesh x coefficient of the panel (U1,U2).

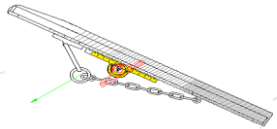
TVM – FAQ

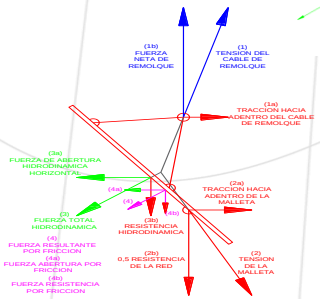
- The FAQ offers information and technological concepts of international relevance.
- The information will be updated periodically and automatically, being a source of knowledge of the latest advances in products, technologies and yields, linked to trawling.

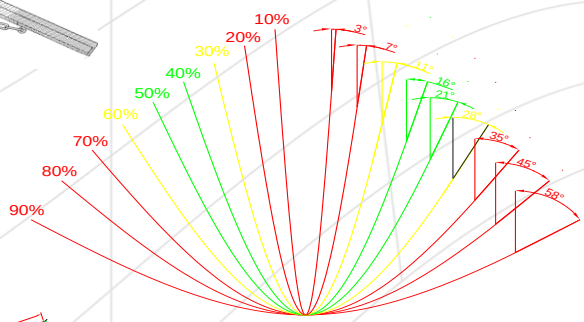


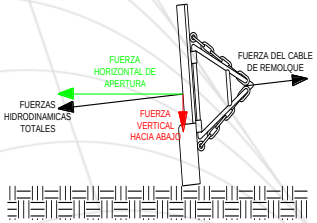
TVM – Unique, high-resolution graphics

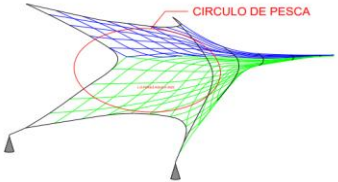


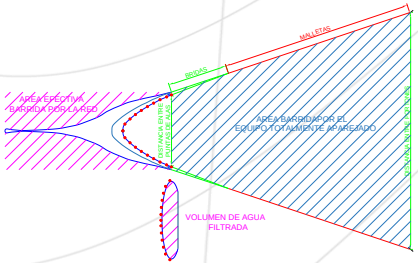




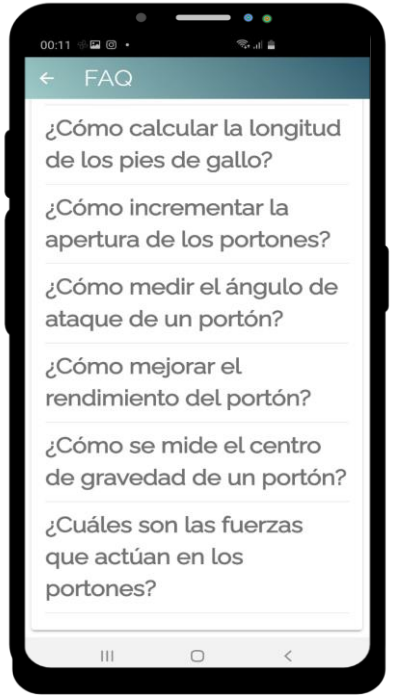








TVM | TRAWL VISION MOBILE



TVM - Version 1.0.0 - Requirements

- The application works on Android devices and soon on iPhone.

- To install it you must enter the Acruxsoft website www.acruxsoft.net from your mobile device, enter products, download and install the application, which will request your data to send you the activation key.

AcruxSoft would like to thank Estremar for their support in the development of this tool and all its participants who made its development possible: Cap. Luis Pérez Águila, Ing. Rafael Olivera, Cap. Felipe Barros, Lic. Celso Bring,
Cap. Frank Chalkling

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TVM

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