

Handling Crabs for the Live Market - Part II

Vivier Transport

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The rapid development of the British crab industry, and in particular the increasing interest in the export of live crabs to continental seafood markets, has resulted in many operators without previous experience turning to this side of the trade. Some species of crab, notably the velvet or swimming crab, are less robust than others and have proved difficult to transport alive from the main fishing areas to the markets. This data sheet therefore outlines some of the steps that can be taken by vivier truck operators to minimise death and maximise the quality of the live product.

The Supply of Raw Material

The quality of the crab you buy can vary widely. In using the term quality we include several factors. Firstly there are variations arising from the natural life-cycle of the crab itself. Most commonly in this context poor quality means soft, or "white-faced" crab which have moulted within the previous two months or so. These crabs are weak and produce a poor yield of low quality meat. You do not want them because they are very likely to die in transit. Your customer does not want them even if they survive. You must, therefore, ensure that fishermen supplying you know how to select "good" crab properly.

Secondly, because attitudes differ from one part of the country to the next you will probably receive crab that has been subjected to a wide variety of handling practices. Some may be very good; much will often be bad or indifferent. If you are lucky you will get consignments from individual fishermen and can hold them separately. From this you will quickly be able to determine who supplies the best quality crab for the live export trade.

Often, however, exporters receive a bulk load which is from several fishermen. All the loads are mixed up in your holding tanks and you then have a mixture of weak and strong crabs and you are unable to tell from where each lot came.

Exporters should, therefore, try to hold all crabs, particularly velvets, in tanks and under good conditions for at least 24 hours before selecting and packing for export. Weak animals will often die within this period and can be removed. Your buyers will pay little or nothing for dead crabs and deaths in lorry tanks will cause poisoning and put the rest of the consignment at risk.

When you first receive crab for holding and selling on the live market it is worth taking great care in selecting good crab. Brown crab should be held upside-down and examined carefully for damage. The tips of the legs and claws are particularly vulnerable and you should also look for limbs that have been broken off rather than cast. If, when examining brown crab, damage to a limb is found, that limb should be made to cast. For claws this can be done by putting the point of a knife into one of the segments and, if necessary, twisting it slightly. For legs it is best to break the middle joint. The crab will then cast the limb at a point close to the body. This point is designed to heal quickly with a minimum of blood loss. You will then get better survival rates and less dead crabs to poison the holding water which the others are in.

Ideally it is preferable to select only undamaged crabs for the live trade. Others can be more profitably boiled up and sold locally for processing.

Transport by Vivier Truck

The overall aim of transporting animals live in a vivier truck is to provide them with conditions as similar as possible to their natural environment, in an attempt to keep as many alive in the best condition while they are being transported.

The success of vivier transport depends upon 4 things: the quality of the raw material this is dealt with in the previous section, the quality of the holding water throughout the trip, quality and effectiveness of equipment and correct handling.

Quality of Holding Water

Since crabs live in full salinity, well oxygenated sea water at 8-10°C should provide them with water of this quality at all times.

Salinity

Transporters should ensure that the water they use for filling the vivier truck tanks is of full salinity - 34 parts per thousand. This important feature of water quality should be checked often - (there is cheap reliable equipment to do this) - especially after times of heavy rainfall, or if removal of water is near estuaries, as large inputs of freshwater will dilute and reduce the strength of the seawater. It may be useful to carry a bag of artificial salt to "top up" salinity if necessary. In addition seawater should not be taken from harbours as wastes from fishing boats such as diesel, oil and lubricants could be present in the surrounding water. The best place for water collection is off a remote headland near to the open sea and away from river mouths.

Oxygen

The level of oxygen in the tanks should be kept as high as possible and should not fall below 5 milligrams per litre - again cheap monitoring equipment is available and/or alarm systems to install within the truck.

Air bubbles should be as small as possible to increase their surface area and absorption rates into the water - again specifically designed equipment is available. If crabs must be transported in densely packed units then water/oxygen access to the centre of these units must be adequate.

Temperature

Temperature variation is a principal cause of mortality in the live transport of crabs and the importance of maintaining low water temperatures at about 8°C cannot be stressed too highly. The main benefits are that at low temperatures crabs are less active. As such they produce less metabolic wastes and require less oxygen to breathe, so putting a reduced demand on the water in which they are travelling.

Crabs suffer shock when suddenly transferred to water of a higher or lower temperature (thermal shock). The maximum instantaneous change in water temperature is 5°C so if the vivier water is to be changed then its temperature must be checked against the temperatures of the new supply. Tank water must not be replaced by water of a higher temperature unless there is a compelling reason to do so - such as contamination. It is also an important consideration to bear in mind to ask/check the temperature of the water that the crabs have been in BEFORE you collect them, and, if applicable, the temperature of the water of holding tanks into which the crabs will be placed at the end of your journey.

Handling

Crabs are living animals and should always be regarded as such during handling. They should be handled firmly but gently NEVER THROW OR STAND ON CRABS as these animals will die and so result in reduced earnings. Crabs should be PLACED in tanks.

Crab density is an important consideration when loading the truck and a general rule of thumb value of 1kg water to 1kg of crab is appropriate. Cascade trucks have a lower water requirement.

Exposure to air greatly weakens crabs and will cause death. This is because the gills dry out and prevent the crab from taking in oxygen. IT IS VITAL TO KEEP AERIAL EXPOSURE TO A MINIMUM . If "dry" handling is necessary ensure that the animals are kept under cool, damp and dark conditions. Mechanisation of this operation can significantly reduce handling and aerial exposure.

The physical and chemical characteristics of the water used for holding and shipping live crabs in vivier lorries can markedly affect their physiology - hence their conditions and survival. In this context the crabs contribute greatly to the fouling of the water by their release of metabolic waste - the greater the temperature stress level and activity of the crab, the greater the production of wastes which foul the water and thus cause even more stress on the animal. From this you can see the need to keep the temperature low and handle the crabs quietly and gently.

In addition the presence of dead crabs, legs and claws in the tanks will quickly sour the water due to the build up of ammonia resulting in many deaths in only a few hours. Dead and weak animals should therefore be removed at the earliest opportunity.

Equipment

Equipment to monitor water quality is readily available and some items only cost a few pounds.

Consideration should be given to obtaining:

Thermometer	- water temperature
Salinity meter	- Salinity
Oxygen Probe	- oxygen
Water quality kit	- ammonia, nitrite, nitrate, pH

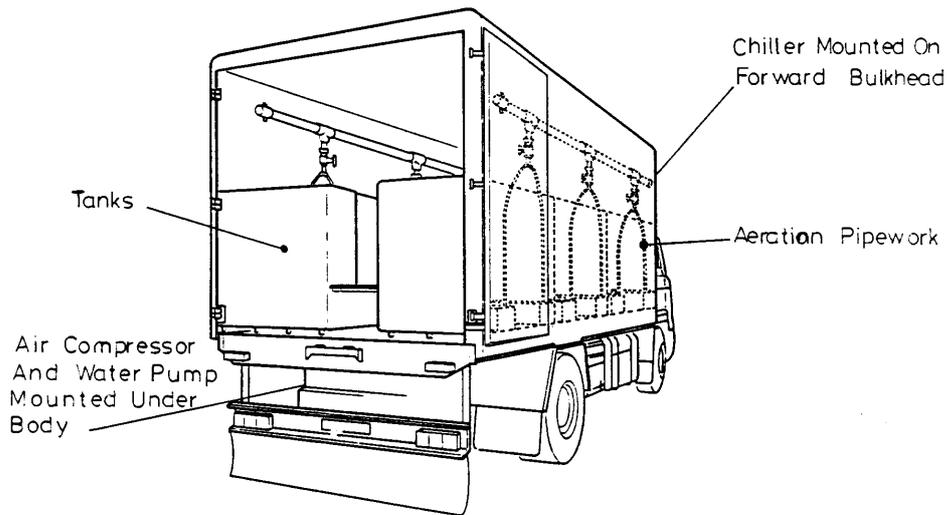
In addition consideration should be given to installing alarm systems to give a warning if any of the parameters fall outside acceptable levels. Such systems are available from commercial companies.

Hygiene

Regular cleaning of holding tanks and vivier trucks is important but often neglected. It should not be necessary to sterilise tanks unless some fungal or bacterial problem is suspected. Great care must be taken, however, to remove limbs, weed and other rubbish from the tanks each time they are emptied. Hosing and scrubbing out of tanks at every opportunity is recommended.

Legislation

There is a range of existing and proposed legislation which relate to the transportation of live crustaceans (crabs).



TANK VIVIER TRUCK Fig N°1

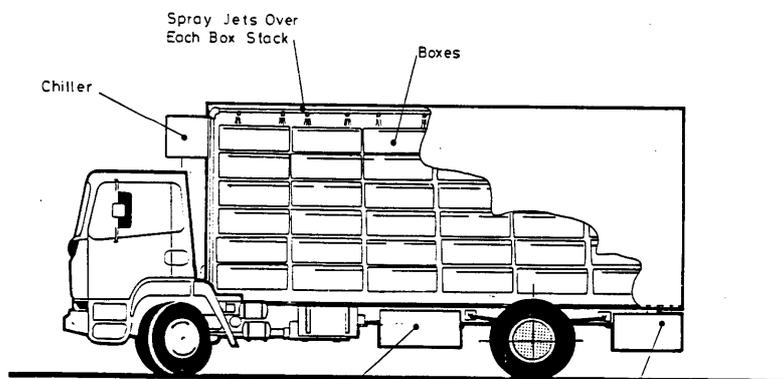
Currently state of uncertainty your best procedure is to contact the various organisations below to determine your specific requirements:

- Trading Standards Officer
- Environmental Health Officer
- Fishery Officer
- Seafish
- Department of Health and Hygiene

Technical Information - Viviers and Cascades

Technical information relating to vehicle specification, payload and equipment is summarised overleaf Table No. 1 - this is to give you an idea of which truck would suit your commercial operation. The guide is not exhaustive, but serves as an indication as to the sort of specification of equipment that is required to do the job.

A recent development from the vivier tank, Figure No 1 operation is the vivier cascade system Figure No 2.



Cascade Vivier Truck Fig N°2

concept of this design is of a reduced water to animal ratio. This is achieved by product being stored in stacked fish boxes through which recirculated salt water percolates from a spray arrangement located on the ceiling of the truck compartment, see Figure No 2. This enables more product to be carried per trip, so increasing profitability. Application of this design should be given thought when considering a vivier operation.

TABLE No 1 GUIDE TO VIVIER VEHICLES

G.V.W Type	Pay Load Tonnes	Load Vol M3	Cost In p/Mille	Pay Load Tank System		Water Pump M3/h@2mH	Air Pump M3/h	Filtration System	Chiller Size K/W	Cascade		▲ Water Pump M3/h
				Product	Water					Product	Water	
Van												
2.5	1.17	6.9	* 44	0.5	0.5	1.0	45	Carbon	0.2	0.82	0.25	0.5
3.5	1.6	13.4	* 66	0.75	0.75	1.0	45	or	0.4	1.2	0.4	0.75
Light Truck /Panel Van												
4.5	3.5	25	* 75	1.75	1.75	4.0	45	Mechanical	0.8	3.0	0.5	1.0
7.5	4.5	40	* 100	2.25	2.25	6.0	45	Cartridge	1.16	4.0	0.5	1.0
Limit Of Car Licence												
Rigids												
7.5	5.	25	+154/108	2.75	2.75	8.0	45	Filtration	0.8	4.0	1.0	3.0
17	7.0	45		6.75	6.75	20.0	70	to 25 micron	1.3	6.0	1.0	4.0
24	12	25	+186/121	7.5	7.5	22.0	70	*****	0.8	10.0	2.0	6.0
32.5	20	45		10.0	10.0	30.0	70	*****	1.3	17.0	3.0	8.0
Artic												
24.4	14	37.5	+145/96	8.0	8.0	24.0	70	*****	1.3	12.0	2.0	6.0
38	20	75	+202/134	10.0	10.0	30.0	100	*****	2.2	17.0	3.0	8.0

* Cost Based On 600 Miles/Week

+ Cost Based On 500 Miles/Week /Cost Based On 1000 Miles/Week

▲ Pressure Will Depend On Type Of Spray Head Used

The Use Of Air Suspension Is Recommended Where Available As this Can Greatly Improve The Ride Standards And Reduce Product Damage Durin Transit

(The Above Figures Are Given Only As A Guide)

Further Reading

MAFF Laboratory Leaflet No 37 - The Live Storage of Lobsters

MAFF Laboratory Leaflet No 39 - Artificial Seawater of Shellfish Tanks