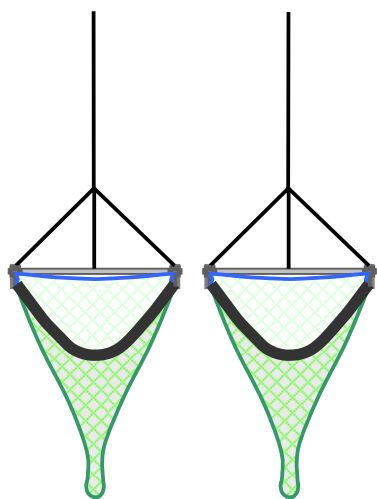
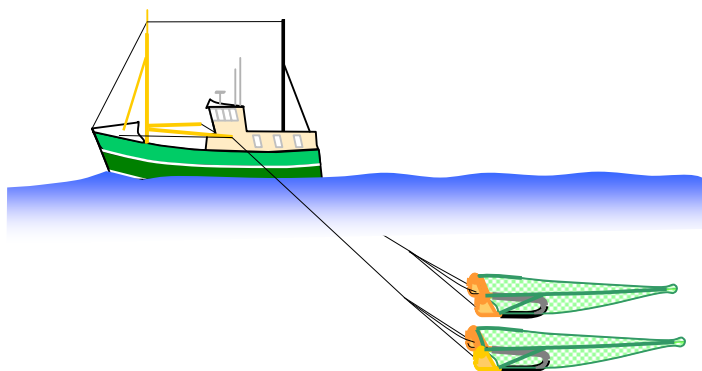


Multi rig trawling – how it has developed

Early Developments

In the last 25 years multi rig trawling has been taken up by much of the UK fishing fleet. The development of multi-rig trawling has probably had as big an influence on the present day trawling industry as the change from sail power to steam and diesel power did many years ago. This fact sheet is the first in a series on multi rig trawling and looks at its history, and the methods being used today.



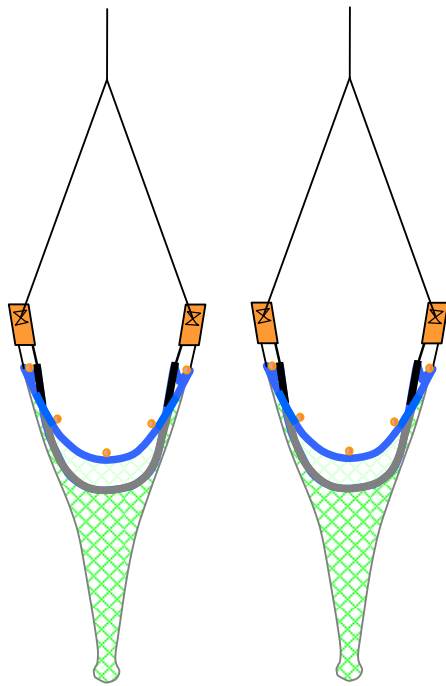
2 Beam Trawls

Fig 1

The very first vessels that could possibly be classed as 'multi rig trawlers' were probably beam trawlers towing two trawls, one from each side of the vessel as shown. They tow the trawls from long derricks extending out from each side of the vessel. Their move from one net to two would have come fairly soon after the progression from sail power to steam and diesel propulsion (Fig 1). This method is still used today by beam trawlers in UK and Europe.

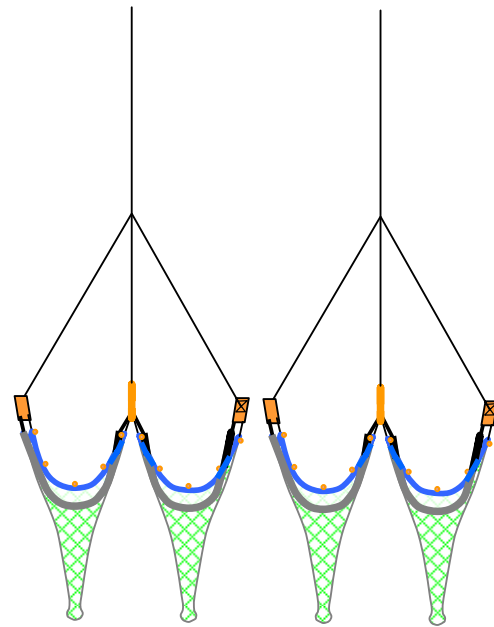
The beginnings of multi rig trawling, using otter trawls, probably lies with the shrimp fisheries in the Gulf of Mexico. Here, during the 1950's they started towing two small otter trawls instead of beam trawls (Fig 2). Each trawl had its own set of wooden otter boards to spread the trawl in a horizontal direction. These otter boards were fitted close to the wing ends of the net.

The trawls were towed and handled in a similar manner to the beam trawls. In this rig each trawl warp splits into two legs approximately 30 feet long, with one leg going to the trawl doors at the wing ends of the trawls.



Two Small Otter Trawls

Fig 2



Double Twin Rig

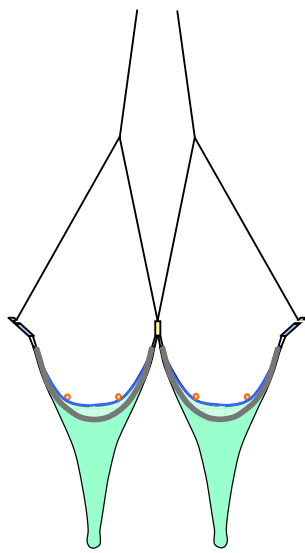
Fig 3

The next progression for these vessels was to double the number of trawls to tow two small trawls side by side from each of the boats derricks (Fig 3). The idea of increasing the number of trawls is to increase the area of seabed swept by the gear without increasing the drag of the gear. In these fisheries the catch rate is proportional to the horizontal spread of trawls. In this rig the trawl warp splits into three. The outside two splits tow the trawl doors with the centre one towing a weighted skid that tows supports the inside wings of both nets.

Some of these boats even added a fifth net towed from the stern in between the other two pairs. This is used as a 'try' net to test if there is enough catch to haul the other four nets. Variants of these methods are now commonplace in many overseas fisheries, used mainly to exploit shrimp and prawn stocks.

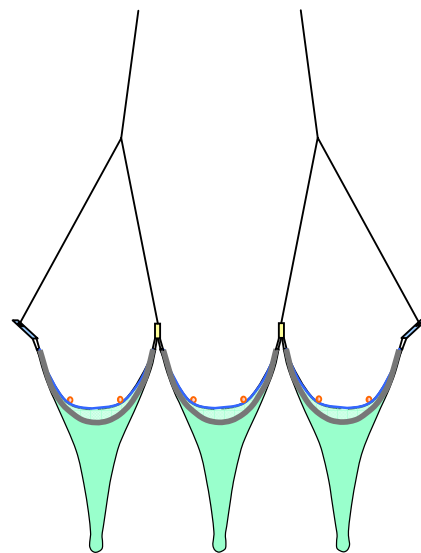
Multi Rig in Europe

In the early 80s UK fishermen started to look at multi rig trawling. In SE England the sole fishermen started using twin and triple rig to target Dover sole in the Thames Estuary. In the North East of Scotland and Denmark fishermen were experimenting with twin rig to target shrimp and *Nephrops*.



Twin Sole Rig

Fig 4



Triple Sole Rig

Fig 5

Sole Rig in South East England

The boats in South East England were around 10 to 12 metres long with engines of 100 to 250 horse power, using five to seven fathom sole nets.

The fishermen virtually copied the rig from overseas of two small nets, with otter boards on the outside wing ends, and a weighted skid in the centre to tow the inside wings of both nets. The towing warp arrangement of the trawls was adapted for towing by their small stern trawlers by splitting each warp into two, approximately 15 fathom from its end. In the twin rig set up (Fig 4) the outside two of these split warps tows the otter boards on the outside wings, the inside two both towing the centre skid with the two inside wings behind them. In the triple rig set up (Fig 5) it is very similar with a third net being added in between the other two. Two weighted skids are attached, one at each of its wing ends with one of the inside split warps towing each one.

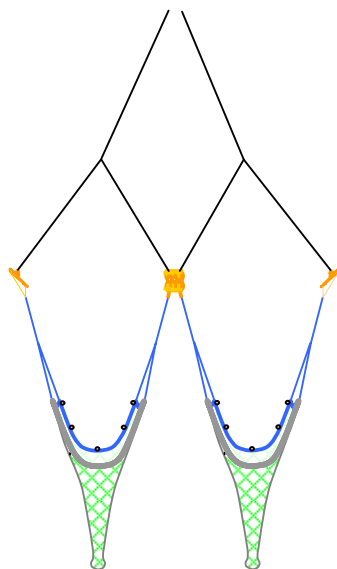
Both these rigs are very efficient at catching Dover sole and the rig has changed very little since its introduction until the present day. Although starting in the Thames Estuary this method of fishing has spread west along the English South Coast

Nephrops Twin Rig in Scotland.

At the same time as sole rig was developing in South East England the Danish fishing industry was developing twin rig to target shrimp and *Nephrops* in the North Sea. Following the Danish example fishermen in North East Scotland started to experiment with twin rig trawling to target these species.

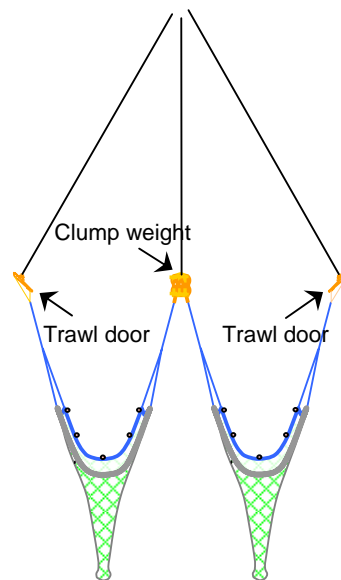
Having investigated the South East sole fishery and the Danish multi rig configurations for both shrimp and *Nephrops*, Seafish gear technologists began developing a system to suit the smaller boats in the UK *Nephrops* fishery. The work that followed resulted in the development of a successful two warp system for small vessels in the lower horsepower categories. All this led to the beginnings of multi rig trawling in the Scottish fleet.

To begin with most fishermen opted for the cheaper option – the two warp system (Fig 6) shown.



2 Warp Twin Rig

Fig 6

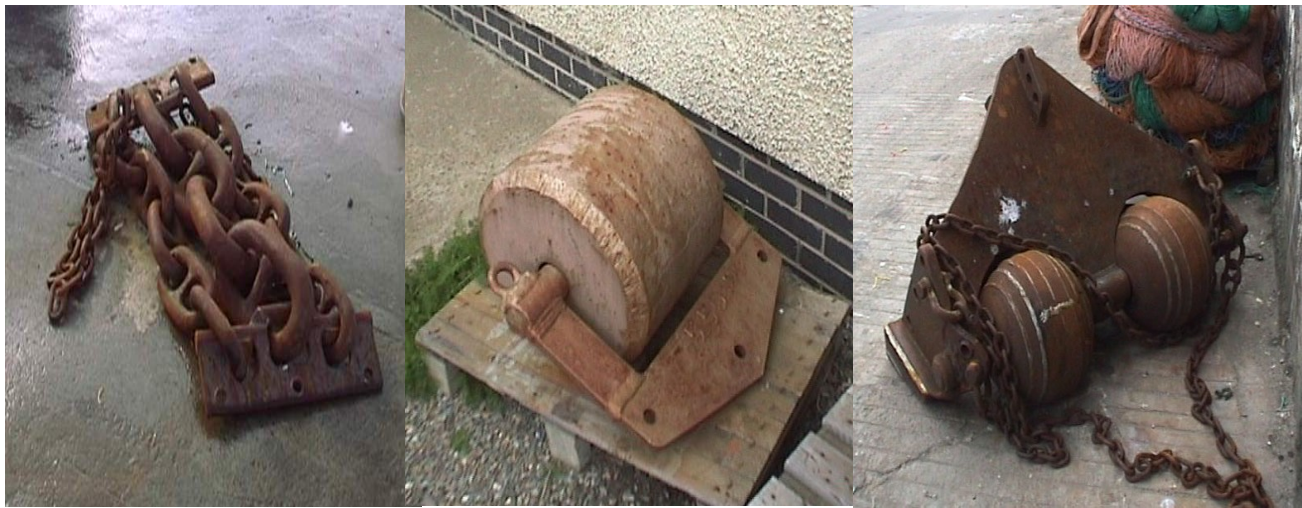


3 Warp Twin Rig

Fig 7

Allowing them to use their existing nets, trawl doors and trawl winch, with only minor modifications to deck layouts. This rig is similar to the two warp system used by the South East sole fishermen. The two trawl warps split into four to tow the trawl doors (modern otter boards) on the outer wing, but in this rig the two inner split warps towed a centre clump weight, with that has the two inner wings behind them. In a *Nephrops* rig it is usual to use sweeps and bridles between the trawl doors and the nets to help 'herd' fish into the trawls. Fishermen quickly realised the catching potential of twin rig trawling and began building specially designed vessels with three barrelled trawl winches fitted and split net drums to allow them to use the more versatile three warp system (Fig 7).

To begin with the primary target of these vessels was *Nephrops* with a by-catch of round fish. The set up of net sweeps, trawl doors and clump weight is similar to the two warp rig except the centre warp goes directly to the centre clump. The purpose of the centre clump weight is to get the centre warp down to the seabed. Originally this was just a clump of heavy chain, but gradually purpose built roller style clumps were introduced (Fig 8).



Large Link Chain Clump

Roller Clump

Depressor Plate Clump

Fig 8

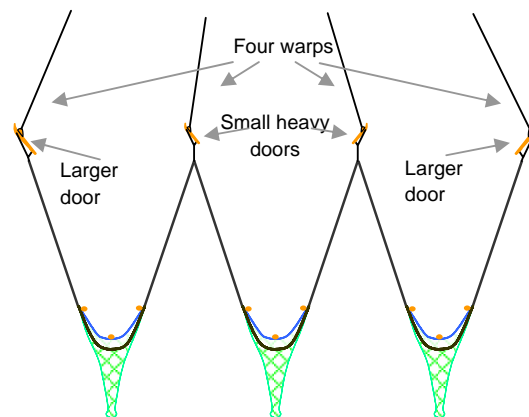
Around this time there was a drop in quayside prices for round fish and a dramatic rise in prices of bottom fish such as monkfish and megrim. As twin rigging was an ideal tool for catching these more expensive species much of the Scottish trawling and seine net fleet spent vast sums of money refitting their vessels to make them suitable for twin rigging.

The trend for the larger twin riggers was to move away from the traditional prawn grounds into the deeper waters and target monkfish and megrim. Due to the increased door spread these boats were usually able to supplement their bottom fish catches with good hauls of round fish. By this time the gear manufacturers had also realised that there was a tremendous market available to them in twin rig trawling. There were nets, trawl doors, clump weights, net monitoring systems, winch packages, computer aided auto trawl systems, all designed and marketed 'specifically' for twin rigging.

By the early 1990's practically all vessels being built for the Scottish fleet were built primarily for twin rigging. This was probably the most significant development in the UK fishing industry in the last 30 years.

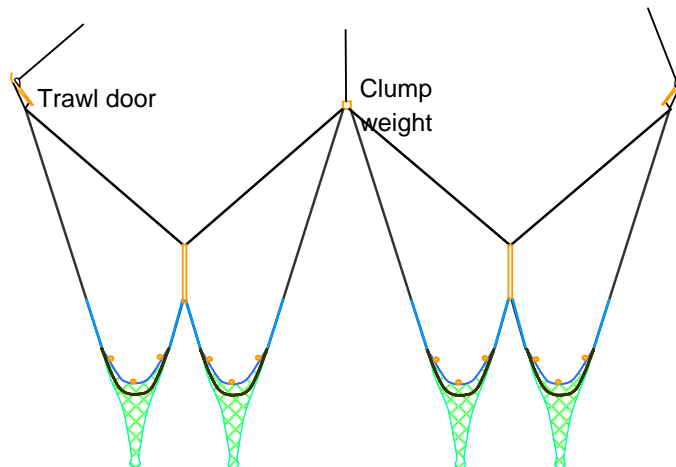
Recent Innovations in Multi Rig

As the catching mechanism of twin rig became better understood some vessels in Denmark and the UK experimented with towing more than two nets behind their vessel. The idea behind this was to try and increase the efficiency of their gear by increasing the area of seabed swept by the gear. There are various options for towing up to eight nets that are being worked commercially by both Danish and EU trawlers. Many of these methods require purpose built vessels to accommodate the multiple trawls and trawl warps. At present there are only a few vessels using these rigs and their long-term efficiency compared to twin rig is not yet proven. A selection of the rigs being used is shown below in Figs 9 – 13.



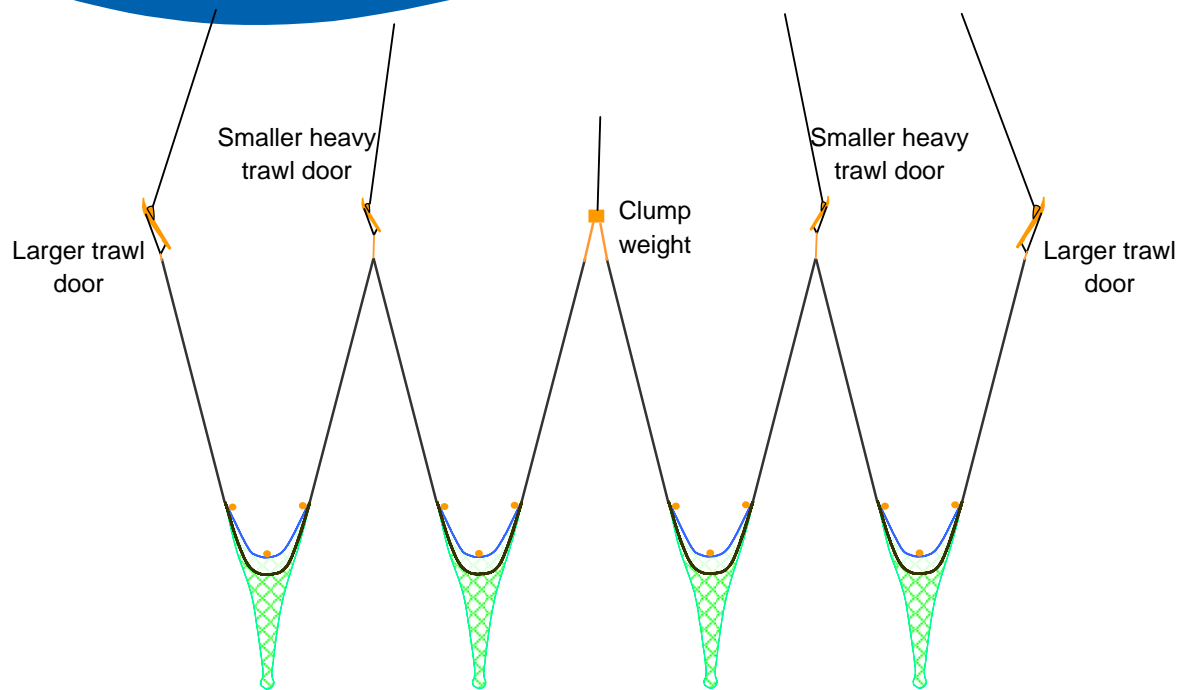
Triple rig spread with four trawl doors towed using four warps.

Fig 9



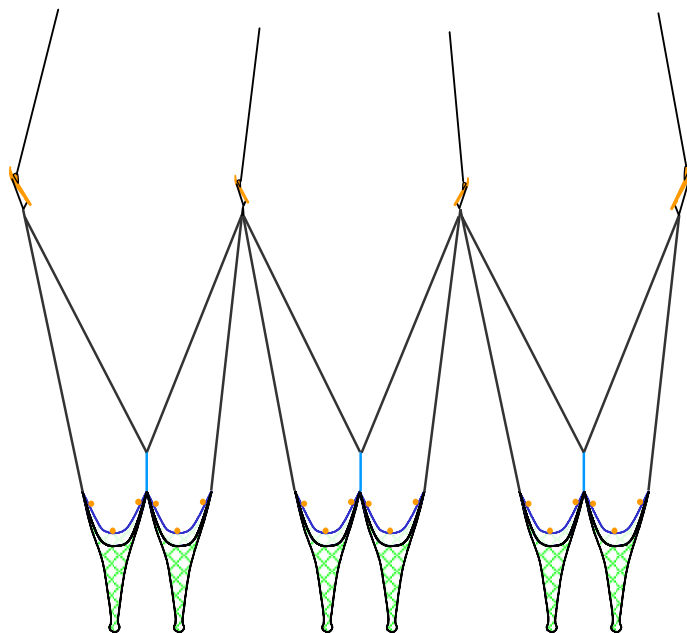
Quad rig towed using three warps

Fig 10



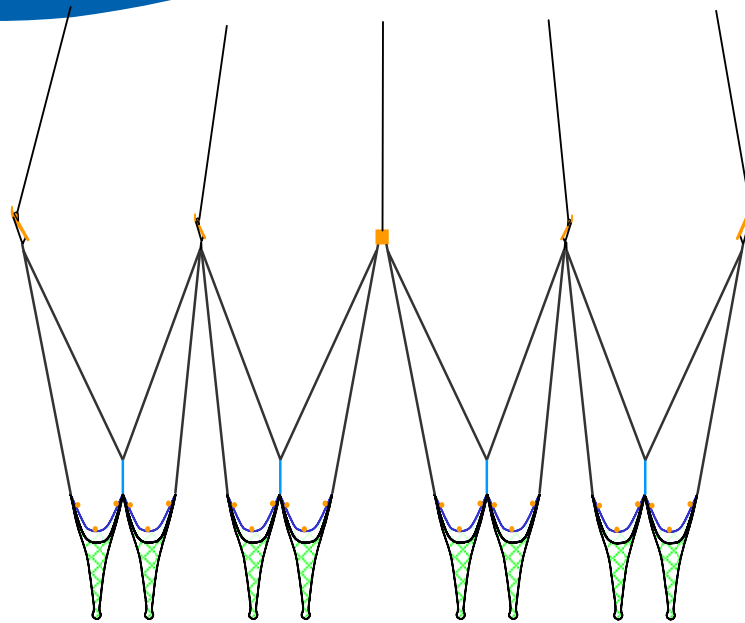
Quad rig using five warps, two small trawl doors, two smaller trawl doors and a clump weight in the centre.

Fig 11



Six nets towed with four warps and two sets of trawl doors

Fig 12



Eight nets towed using five warps, two sets of trawl doors and a clump weight

Fig 13

Currently all these methods are being used by a few vessels in the North Sea, but there has not been the big 'rush' to take up trawling using more than two nets, as there was to make the initial move from one trawl to twin rigging in the early nineties.

Some of the European beam trawlers are employing a method of twin rigging similar to that used by the overseas multi rig trawlers, where they tow one trawl and a set of trawl doors from the beam trawl derricks in a similar manner to their traditional beam trawls (see Fig 3). This method called 'out rig trawling' enables them to tow two otter trawls with reduced fuel consumption and much less benthic impact than a traditional beam trawl. The trawls used have a higher headline height when compared to a beam trawl allowing these vessels to target a different mix of fish species.

For more detailed information on any of the above fishing methods contact Seafish gear technologists.