SEA FISH INDUSTRY AUTHORITY
Industrial Development Unit

WEIGHING/GRADING AT SEA TRIALS
MFV CRAIGMILLAR

Internal Report No. 1312

April 1987

R.S. Mounce

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SUMMARY

This report summarises the results of the weighing/grading at sea trials carried out aboard the CRAIGMILLAR (MFV) during week ended 10th March 1987.

The principal objective of the exercise was to introduce iced, weighed and graded at sea fish in plastic boxes into the auction sale system at Fleetwood with a view to improving home landings in terms of quality and presentation and thus raising the average market value of sales.

The need for a more flexible sea-going weighing system for mixed fisheries was made apparent by the variance in the fish over-weights recorded at the checkweighing mainly due to the large size of some of the fish.

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1. OBJECTIVE

To introduce iced, weighed and graded at sea fish in plastic boxes into the auction sale system at Fleetwood, with a view to improving home landings in terms of quality and presentation and thus raising the average market value of sales. The species designated to be weighed/graded are cod, whiting, haddock and hake. Any such fish will be referred to as 'trial' fish and any boxes of such fish will be referred to as 'trial' boxes.

2. BENEFITS SOUGHT

Better quality and presentation is expected to attract higher auction prices, which in a favourable economic environment should raise the level of vessel profitability, which in turn may generate growth in investment in the catching side.

3. HOST VESSEL AND PERSONNEL

	Gear Type	Skipper	Reg. length.	HP	Year Built
CRAIGMILLAR	Trawl	Tom Grodan	68.0'	260	1959
No. of crew:	4 (inc. Skipper)				
Trial Personnel:	R.S. Mounce (SFIA) and G. Hill (TRS)				

4. EQUIPMENT USED

1 Nesco 'Fishway' scale set at 3.5 stone (or 22.2kg)
GPG Fish Baskets (45 lit.)
1 Fish measuring board appropriately marked for different grades
150 Allibert 75 litre plastic fish boxes (Scotbox design)
Waterproof labelling materials
1 Mettler electronic 'quay side' weighing machine
(1 extension lead borrowed owing to battery failure)
1 35mm camera and film.

5. OPERATIONS

5.1 SEA-GOING OPERATIONS

We sailed on the lunchtime tide on Wednesday 4th March following a delay of two days during which essential repairs to the CRAIGMILLAR were carried out. Our first 'stop' was the Kish Bank off the East coast of Eire, some 120 nautical miles from Fleetwood. Arriving at around 0300 hours on Thursday morning, after steaming for some 14 hours, we shot the gear. As can be seen in Table 1 the first tow was somewhat shorter in duration than the average for this vessel, 5½ hours. This was due to the gear becoming entangled on the seabed and resulted in a yield of only 2 baskets (each full basket is estimated to contain 6 stone) of roker and ½ basket of mixed. The first full tow produced 5 baskets in all, comprising 1½ of 'white' pollack, 1 each of hake, roker and coley and ½ basket of cod. At this stage we had only caught enough to be able to weigh and grade half a box (3.5 stone) of grade 1 hake. Apparently catches at the beginning of this type of trip (in terms of location, season and course) were generally low owing to the initial tows being against strong tides. Haul No. 3 amounted to 8 baskets and consisted of hake, roker, white pollack, cod and whiting. Our cumulative catch of all fish at this point was 90 stones, equivalent to nearly 13 boxes of 7st. With the hake element of this third haul we were able to fill our first box of weighed and graded at sea fish - hake grade 1.

During the weighing of this first box the inherent problems of attempting to weigh fish (esp. large ones) to a standard unit weight, in this case 3.5 stone, became apparent. Most of the problems seem to stem from one - that of under-estimating the actual weight - which arises from the surplus weight that is invariably included in the last fish required to 'tip' the drop-weight scales employed. The potential overweight presumably increases with the size of fish being weighed and is likely to be compounded if, as it was in this case, the unit is weighed in two halves (i.e. 2 x 3.5 stones). However it should be pointed out here that the Authority were expecting to weigh smaller fish, in particular whiting and haddock, otherwise a scale set to 7st would have been recommended. The excess over the assumed weight in the box (i.e. 7st) is likely to represent lost revenue to the owners which may take one or both of two forms. Firstly, the overweight appears to be given away to the buyers and secondly, should the overweight result in the boxes being overfilled, this could lead to low quality fish (as a result of under-icing or damage from the box above) and hence lower market prices. With especially long fish e.g. large hake, the overfilling of boxes is more likely to occur since the capacity of the box does not appear to be used efficiently. This is because such fish cannot be laid flat in the box which has the effect of raising the level of the box contents.

Evidence of what can result from overfilled boxes is given by Exhibit 1 - our first box (A) of weighed and graded at sea fish. In anticipation of the problems mentioned above this box was 'ear-marked' for checkweighing ashore. In spite of the fact that grade 1 hake had so far proved unsuitable for this exercise it was decided, with the consent of the skipper, that we should persevere with the designated species. Excluding this quantity of 'eligible' fish may have had a significant effect on the scope of the trial besides which, future boxes of grade 1 hake might prove less problematic (as was the case) in terms of excess weight. It would seem that the extent to which large fish can be weighed accurately into standard units with drop-weight scales is determined by the

size deviation within the parameters of the grade. Obviously where catches deviate in size substantially it is possible to increase the accuracy by exchanging fish of different sizes during the weighing process. In contrast, where catches are largely constituted of fish of the same or similar size (known as runs), such swapping of fish is unlikely to achieve greater accuracy. One way of circumventing the problem of overweight is to use smaller fish from other grades to get nearer to the target weight but this would defeat the objective of proper grading and meet resistance from buyers not to mention being contrary to EEC grading regulations.

After four tows we had graded and weighed two boxes of grade 1 hake and one box of grade 3 cod. At this stage it seemed probable that of the designated species only six grades would be caught in sufficient quantity to merit inclusion in the exercise, three of hake (1, 2 & 3) and three of cod (3, 4 & 5). In view of the limited space available in the fishroom, shown by Exhibit 3, with this amount of grading, it is likely that had more grades been available some would have been sacrificed. The practicality of weighing/grading at sea on vessels engaged in this type of mixed fishing would appear to be fully tested when large catches of 'not to be graded' species are handled at the same time as designated ones. Operational difficulties arise because one system (e.g. for graded species) encroaches on another (e.g. for non-graded species). To a limited extent our fifth tow created such a situation, presenting the crew with 228 stone of dogfish (equivalent to about 30 boxes) to be stowed, a procedure which is generally prolonged by the fact that this species tends to get entangled in the net. A good 'shot' of dogfish would typically exceed 100 boxes and, but for a large hole in our net we may have had to handle such a quantity from this tow. As shown in Exhibit 4 this puts additional demands on fishroom floorspace such that partly filled boxes of graded fish need to be shuffled around other available space. Even when boxed, such catches significantly eat into fishroom floorspace, although in many cases such catches would

be overlanded to the home port at the first opportunity thus freeing the equivalent floorspace, for completing the trip taking 'prime fish'.

Over the whole voyage, towing time amounted to some 48 hours which yielded an estimated 573 stones of fish of which 42% were dogfish and 25% were of the designated species, cod and hake. As is shown in Table 1 the total catches of the latter two species were, at 72 stones, equivalent. These were caught over 8 tows, Nos. 2 to 9 inclusive, averaging 9 stone of both cod and hake per tow. With an allowance for pieces (including un-graded) this worked out to be just under 2 boxes of graded fish per tow. The final tow (No. 10) was cut short owing to a recurrence of an engine-related problem that had earlier halted operations for several hours. Following this the skipper decided to head for home - at around 0500 on Tuesday 7th March.

In retrospect the sea-going part of this exercise appeared not to have disrupted the vessel's operations to any noticeable degree, but this was largely due to the co-operation of the crew especially the mate whose job was the most affected by our presence. Clearly, greater flexibility in fishroom stowage is essential before grading and weighing of fish is attempted, especially if a range of species has to be handled. This, and the uncertainty of catch composition can only be accommodated by the adaptability and patience of the crew.

5.2 SHORE OPERATIONS

At 0530 on Wednesday 11th March the landing of our catch commenced with priority given to the 'trial' fish boxes (15 in total) which were comprised as follows:-

Species	Grade	No. of Boxes (7st)
Hake	1	3
Hake	2	2

Species	Grade	No. of Boxes (7st)
Hake	3	1
Hake	4 & 5 mixed	1
Cod	3	3
Cod	4	3
Cod	5	2
	Total	**15**

The box of mixed hake (grade 4 & 5) was resorted ashore in the interests of obtaining the highest market prices. Some checkweighing time was lost owing to faulty electrical equipment but despite this a sample of six of these trial boxes were checkweighed representing 43% of the total available (14). Only in the case of hake was it possible to note the variation of weights within one grade. As shown in Table 2 box A, contained 116.8lbs of grade 1 hake, nearly 12% more than box B. These checkweights emphasise the potential loss there is using this method to weigh large and in the case of hake expensive fish (as mentioned earlier Box A was marked early in the voyage to ensure that it would be checkweighed). Box A was not the only casualty of overfilling as shown by Exhibit 2, a picture of box E - cod grade 3. However, judging by the excess (only 6½lb) the problem may in part have arisen from too much ice.

According to one school of thought, overfilled boxes will be recognised as such by merchants and therefore market forces will push respective prices upwards to account for the excess. However, this is likely to be offset to some degree by the presence of ice in these boxes which no doubt restricts the pre-sale examination usually carried out by the merchants. Irrespective of whether fish is weighed at sea or ashore the chief problem associated with weighing large fish - that of significantly extra weight - will apply and the smaller the unit of weight, the larger the potential overweight. In the case of weighing ashore there is always the option of labelling an overweight box accordingly i.e. with a

declared weight. This could equally apply to sea graded fish if boxes suspected of being overweight were marked at sea and then checkweighed ashore, although this may only appear worthwhile in the case of valuable species, and would add additional cost in terms of labour ashore.

Following the sale, the agent of the CRAIGMILLAR, David Rainford, received a complaint from a buyer in respect of the box of grade 3 hake (Box D) which they claimed was one stone underweight i.e. containing only 6st of fish. Very shortly after this the foreman of the same company returned several grade 3 hake which had apparently been damaged whilst sharing the cod end with dogfish (we were told after the sale that such fish would generally be put aside when sorted ashore for separate sale). It seemed likely that the buyer had re-weighed the box contents without the amount they had returned but, they claimed not. Since box D (as shown in Table 2) was the only box of grade 3 hake and its checkweight totalled 113.3lbs, 15.3lb in excess of 7st, it seems impossible that only 6st was initially offered for sale. Unless this 14lbs of fish was taken prior or during the sale it must have disappeared in transit between the market floor and the buyers premises.

Despite this controversial start the response from the merchants to this 'alien' product and process was very favourable. Of the five buyers, four were impressed with both the quality of the fish and the standard of the grading. This was not, however, reflected in the prices paid as shown in Table 3 with only two grades of trial fish exceeding shore weighed/graded fish in terms of average first hand price. Buyer resistance to this product and especially its presentation (i.e. new box, new unit of weight, iced) is understood to be at its greatest during the 'introductory' phase. According to the moans overheard on the market, the presence of ice in the boxes seemed to be the major barrier to the merchants paying the full price, presumably because the merchants believe that in some way ice is being included in the fish weight for which they are being charged. Perhaps, more important because their pre-sale

examination of landings for sale is, in the case of trial boxes, substantially restricted by the presence of ice. This must to a large extent abrogate some of the skills of buyers especially those judgements concerned with the quality and weight of fish in a box, on which, amongst other criteria, their bids will be based. Such understandable resistance to change should fade once the benefits of weighing and grading at sea, particularly the improvement in quality, are realised.

6. CONCLUSIONS

Grading and weighing at sea were demonstrated within the Irish Sea fishery. Problems associated with the weighing system when used with large fish of high value are highlighted. The other aspect which caused problems was the requirement to hold a large number of part filled boxes due to the nature of the fishery thus causing congestion within the fishroom.

On the other hand generally favourable comments about quality were made by buyers of the fish and initial reluctance indicated in prices paid was most likely to be a temporary phenomenon associated with doubts about the actual weight of fish in a box when mixed with ice.

TABLE 1

CATCHES PER TOW BY SPECIE

Tow No.	Duration of Tow (Hrs)	Estimated Wt Caught (st)	Cod	Dogfish	Hake	Pollack (white)	Roker	Other
1	3	12	-	-	-	-	12	-
2	5½	30	3	-	6	9	6	6
3	5½	48	9	-	12	12	12	3
4	5	57	6	-	15	-	24	12
5	5½	249	6	228	9	-	6	-
6	5½	48	12	-	15	9	6	6
7	5½	30	-	-	6	12	12	-
8	5½	48	18	-	6	9	9	6
9	5½	45	18	12	3	-	12	-
10	1½	6	-	-	-	-	-	6
TOTALS	**48**	**573**	**72**	**240**	**72**	**51**	**99**	**39**

TABLE 2

RESULTS OF THE CHECKWEIGHING OF SAMPLE TRIAL BOXES

Box	Species	Grade	Fish Weight			Ice Weight (kg)			Ice/Fish Ratio	Total Weight
			lbs (1)	(Over** Weights)	kg (2)	Top (3)	Bottom (4)	Total (5)	(5/2) (6)	(kg) (7)
A	Hake	1	116.8	(18.8)	53.0	3.5	8.3	11.8	0.22	64.8
B	Hake	1	103.6	(5.6)	47.0	4.9	7.6	12.5	0.27	59.5
C	Hake	2	108.9	(10.9)	49.4	6.9	7.0	13.9	0.28	63.3
D	Hake	3	113.3	(15.3)	51.4	4.8	6.9	11.7	0.23	63.1
E	Cod	3	104.5	(6.5)	47.4	4.2	7.5	11.7	0.25	59.1
F	Cod	5	104.7	(6.7)	47.5	5.0	10.3	15.3	0.32	62.8
TOTAL		**-**	**651.8**	**(63.8)**	**295.7**	**29.3**	**47.6**	**76.9**	**0.26**	**372.6**

* Of box contents

** (1) - 98lb

TABLE 3

AVERAGE AUCTION PRICES OF TRIAL PRICES (£ PER STONE)

	HAKE			COD		
Grade	1	2	3	3	4	5
A. Trial	24.50	21.00	16.00	9.90	9.40	8.40
B. Other (Graded/ weighed ashore)	26.00	23.50	15.00	9.80	-	9.60
Differential (A-B)	-1.50	-1.50	+1.00	+0.10	N.A.	-1.20

EXHIBIT 1: BOX A - HAKE GRADE 1

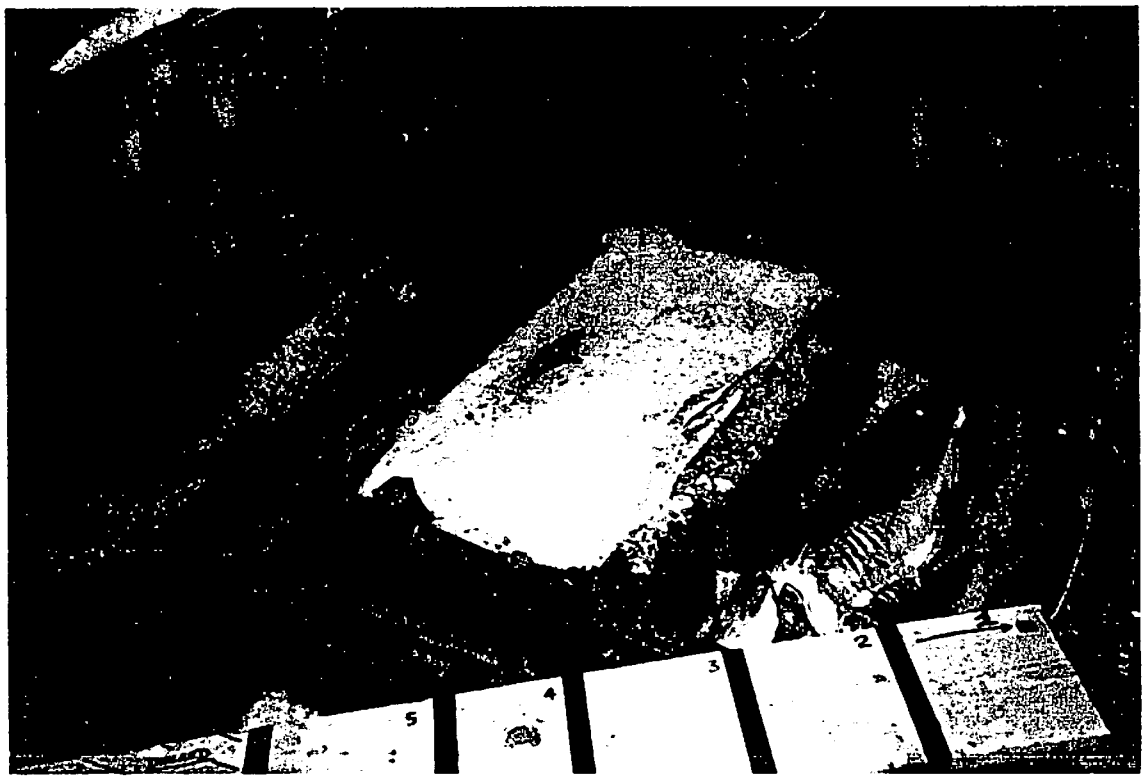

EXHIBIT 2: BOX E - COD GRADE 3

EXHIBIT 3: FISHROOM

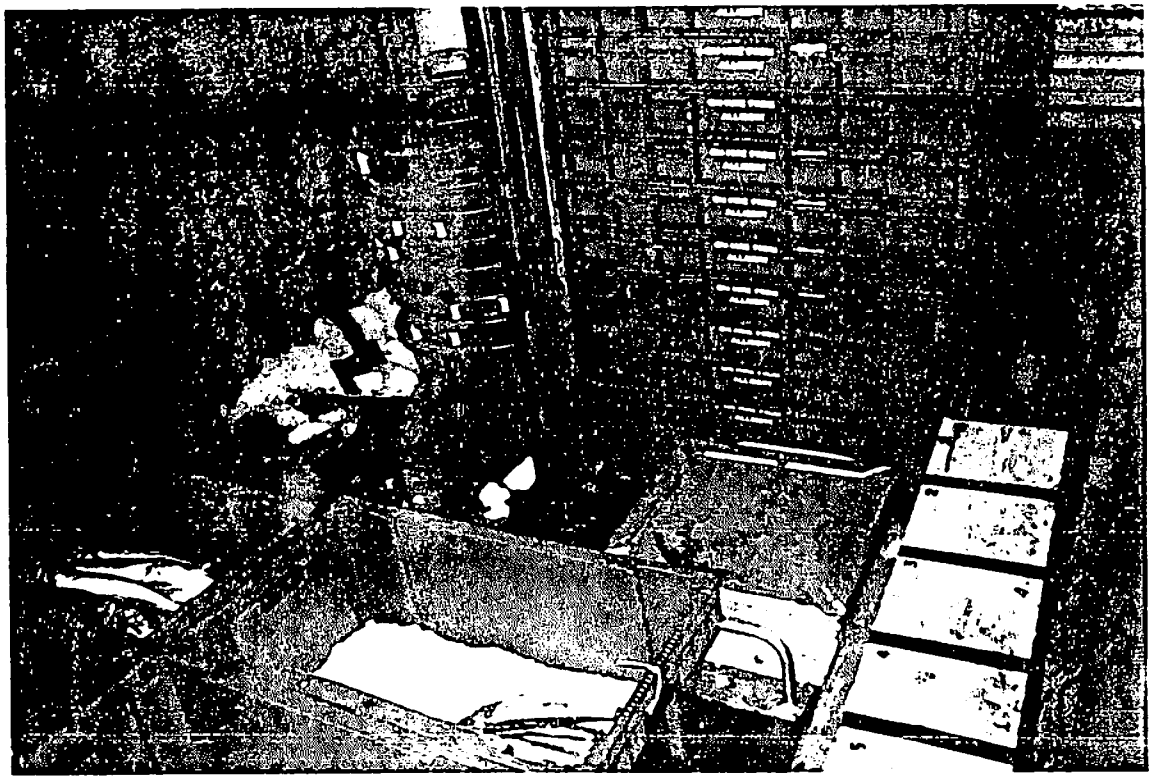

EXHIBIT 4: FISHROOM