

On the Arrival Time, Waiting Time to Unload, Unloading Time and Waiting Time for Departure for Purse Seiners At Mangalore Landing Centre

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Fifty four purse-seine boats at Mangalore landing centre were observed during different stages of unloading fish catch. It was found that a boat takes 75% of the berthing time to unload an average quantity of 2.4 tonnes of fish. Further, unloading period and catch were found to be directly related where it was estimated that 5 to 7 minutes are spent in unloading about half a tonne of fish to a nearby tempo by employing 9 ± 2 labourers.

Mangalore is one of the biggest landing centres where daily about 200 purse-seine boats unload their catch during the peak season. As soon as fishermen bring their catch, there is competition to dispose the catch quickly for better financial returns (Anon, 1982). The intensity of competition depends on the availability of space at a landing centre, the quantity of catch with type of species, number of purchasers etc. On the whole, these factors decide the time spent by boats at a landing centre during various stages of unloading the catch from entry to a landing centre till their departure. To assess this a study is made on randomly selected purse-seine boats at Mangalore landing centre for the fishing season 1982-83. This type of study would enable in expanding the berthing facility of a landing centre if waiting periods are higher compared to total unloading time of a fishing boat when too many boats enter the berthing place at one time. On the other hand, the boat crew would get an idea of waiting time at different stages of unloading the catch based on their quantum of catch.

Materials and Methods

During the period under study, a random sample of 54 purse seiners - 20 main boats and 34 carrier boats - were observed from their entry to the landing centre till their departure. At least once in a month, a

sample of purse-seine boats was observed on random days, where a sampling day was stratified with regard to time based on the intensity of arrival pattern of purse-seine boats. The data on arrival time to landing place, auctioning time, unloading time and the departure time nearest to a minute were noted using an electronic watch. The catch in terms of tempos, number of persons engaged in unloading the catch were also recorded. From the collected data the waiting period to auction the catch, auctioning period, unloading period and the waiting period to departure were calculated in terms of minutes as mean values. The mean periods so derived based on the number of sampled boats were analysed statistically using the 3-factor factorial analysis. (Snedecor & Cochran, 1967). Since the unloading period may depend upon the quantity of catch and the number of persons engaged in unloading the catch, regression analysis was also carried out.

Results and Discussion

Given in Table 1 are the average values ($\bar{T}$) of waiting period to unload (t_1) unloading period (t_2) and waiting period for departure (t_3) after unloading the fish of main and carrier boats separately under three stratified timings. During the course of the investigation it was observed that fish catch of purse-seine boats was being auctioned in 2 to 4 min. Had there been no difference in the type of boats or in the stratified timing with regard to the catch, it took an average of 45.46 min (74.76%)-when the average

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Table 1. Statistical values of different periods (in minutes) and other details of purse-seine boats during landing at Mangalore landing centre

Stratified timings	Statistical values	Main boats (n_1)			Carried boats (n_2)			Combined ($n_1 + n_2$)		
		t_1	t_2	t_3	t_1	t_2	t_3	t_1	t_2	t_3
9.30 to 12.00 hours	$n_1=4, n_2=12$	12	40	6	6.42	45.75	6.92	7.81 (13.28%)	44.31 (75.34%)	6.69 (11.38%)
	SD	3.46	19.58	3.16	2.54	26.39	4.98			
	CV	28.67	48.95	52.7	39.57	57.68	72.01			
	$\bar{C} \pm \frac{SD}{r}$		2.13 ± 1.11 *			2.25 ± 1.14 0.6386			2.22 ± 1.10 0.6449	
	regression		*		$U_t = 12.4342 + 7.4035C$			$U_t = 12.4635 + 7.1772C$		
12.01 to 14.30 hours	$n_1=6, n_2=15$	8.67	36.83	7.83	10.33	51.6	5.4	9.86 (16.57%)	47.38 (74.81%)	6.09 (9.62%)
	$\bar{T}$									
	SD	2.73	15.70	3.97	5.16	28.06	3.02			
	CV	31.53	42.63	50.69	49.97	54.38	55.91			
	$\bar{C} \pm \frac{SD}{r}$		2.73 ± 1.78 0.8142			2.5 ± 1.18 0.6237			2.53 ± 1.33 0.5610	
	regression	$U_t = 17.2202 + 3.5932C$			$U_t = 15.0629 + 7.4565C$			$U_t = 20.001 + 5.4116C$		
14.31 to 17.00 hours	$n_1 = 10, n_2 = 7$	10.9	45.7	5.4	5.86	42	8.20	8.82 (14.8%)	44.18 (74.14%)	6.59 (11.06%)
	$\bar{T}$									
	SD	4.79	19.44	3.89	4.41	18.17	6.32			
	CV	43.99	42.53	72.09	75.35	43.25	76.24			
	$\bar{C} \pm \frac{SD}{r}$		2.65 ± 1.34 0.9423			2.1 ± 0.87 0.4803			2.43 ± 1.17 0.7958	
	regression	$U_t = 9.3276 + 6.8627C$			$U_t = 20.727 + 5.0478C$			$U_t = 13.6263 + 6.2952C$		

SD, CV, r: Standard deviation, coefficient of variation and correlation coefficient between unloading time and catch
 *: correlation coefficient and regression were not calculated for sample size of less than 5

berthing time was 60.81 min-for a purse-seine boat to unload an average catch of 2.4 ± 1.2 t ($\bar{C} \pm SD$). After unloading, the waiting period at the landing centre for departure was calculated as 6.42 min (10.55%). Here, it could be seen that 75% of the total berthing period at the landing centre was spent in unloading the catch. Only less than 10% of the berthing period was spent either for finding place for landing a boat or to draw attention of auctioners and purchasers. Of all the three different periods the waiting period to departure was the most inconsistent than the other two (Table 1). The fluctuation in mean periods could be mainly because of crew's delay in getting diesel for their next day's trip, collecting revenue from fish sales and getting entangled with rest of the boats to come out from berthing place. The mean waiting period to unload and unloading period were higher during 12-14.30 h for purse-seine boats than the waiting period to departure after unloading the catch due to the fact that these boats should make the way to other incoming boats for unloading the catch.

It is likely that the unloading period may depend on the catch and also on the labourers engaged in unloading the catch. But it was found that the correlation coefficient (r)

between unloading period and the number of labourers was very low being 0.23, since the number of labourers remained almost constant at 9 ± 2 level irrespective of type of boat or arrival time of purse-seine boats. Hence the correlation coefficient between unloading period and catch was calculated and found to be 0.6373, which was significant. Further, the regression equation of unloading period on catch was calculated as $U_t = 16.3292 + 6.0625 C$. This means that for unloading one tempo load of fish-which was taken as equivalent to half a tonne-it requires an average of 6 min with the help of 9 labourers on an average. The boatwise correlation coefficient and regression equations for three stratified timings are shown in Table 1.

From Table 1 it is not clear whether there was any significant difference between main boats and carrier boats and also between stratified timings with regard to mean waiting periods. Hence 3-factor factorial analysis was carried out on the mean periods and results are given in Table 2. The stratified timings alone were highly significant due to mean periods. This might be due to the peak landings of boats during 12-14.30 h making them to wait more for receiving facility at the landing centre, irrespective of catch. But there was no significant difference in the

Table 2. *Analysis of variance of mean periods (in minutes)*

Source of variation	Degrees of freedom	Mean sum of squares	F-ratio
Between boats	1	4.743	0.253
„ timings	2	2573.519	137.08*
„ periods	2	0.560	0.029
Interaction between boats & timings	2	28.020	1.49
Boats & periods	2	16.887	0.899
Timings & periods	4	0.575	0.031
Error	4	18.773	—

*Significant at 5% level

Table 3. *Analysis of variance of mean catch (in tonnes)*

Source of variation	Degrees of freedom	Mean sum of squares	F-ratio
Between boats	1	0.3314	1.436
„ timings	2	0.3246	1.406
Error	2	0.2308	—

mean periods either due to the type of boats or due to the type of waiting periods. Though the stratified timings had significant effect on the mean periods (Table 2), the mean catch was not significantly different among three stratified groups. The results were brought out after statistically analysing the mean catch of two types of purse-seine boats as shown in Table 3. In the light of these results, the mean periods were combined for two types of boats along with other information with regard to mean catch, correlation and regression as shown in the last column of Table 1. Thus, the catch of a purse-seine boat was not marked either by the arrival time of boats to landing centre or the type of purse-seine boat.

In conclusion it may be said that the purse-seine boats would be back towards the landing centre when there would be no more

catch for further hauls. Much of the time of their stay at landing centre was due to unloading of the fish catch. This study on waiting periods of purse-seine boats is a part of the whole fishing voyage where other components like voyage time to fishing ground, hauling period, returning time to landing centre etc. are not discussed here.

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