

# LENGTH OF SERVICE FOR VARIOUS PROMOTIONS IN NAVAL RANKS

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## ABSTRACT

Naval seamen are at present signed up initially for 10 years, then for 5 years and then for every two years. The present relative strength is OD & AB Rates 70 per cent, Leading 15 per cent, Petty Officers 10 per cent, and Chief Petty Officers 5 per cent. At present AB Rates are getting promotion after total service of eleven years or so. It was sought to plan for steady state when Navy has expanded fully. First objective is to make signing up periods longer and under a probable basis of relative strength, the automatic promotion points turn out to be 14, 19 and 23 years. This will make this career rather unpopular. The relative strengths should be slightly modified and promotion points can be brought down provided only selected few get promoted. It has been shown that roughly 33 per cent should be promoted at any competition for promotion to Leading or to Petty Officers' level. There should be four chances for first promotion after 10, 11, 12 and 13 years of service and 3 chances for second promotion after total 15, 16 or 17 years of service. AB Rates who fail to get promotion, should not be signed up after 20 years of service. Promotion to Chief Petty Officers should be done after 20 years of service and 75 per cent of eligible Petty Officers can be promoted.

The calculation is based on the premise that there is 2 per cent wastage each year upto 10 years of service and subsequently 1.5 per cent overall wastage per annum. Also overall loss is 30 per cent at second signing up after 15 years of service and 10 per cent at 3rd signing up after 20 years of service. These discrete losses will be relatively less for higher grades.

### Periods of Signing up

At present ordinary sailors are taken on contract for ten years of service in the first instance. They can be signed up for a further period of five years and then for two years successively till they can complete 25 years of service. It has been realized now that this system is not suitable for Indian conditions where both the employees as well as employers would prefer a longer assured length of service. A longer period of signing up would enable the Navy to plan career prospects and advanced training on a rational basis. It is now desired that the signing up period should be 15 years in the first instance followed by two periods of 5 years duration each subsequently.

**Lengths of Service for Automatic Promotion**

From existing data the expected wastage is about 2 per cent per annum upto 10 years service and later 1.5 per cent per annum with losses of 30 per cent at 15-year option point and 10 per cent at 20-year option point. The present sanctioned strength in various categories is as follows:—

Seamen*	..	..	..	..	70 per cent
Leading Seamen	..	..	..	..	15 per cent
Petty Officers	..	..	..	..	10 per cent
Chief Petty Officers	..	..	..	..	5 per cent

At first, under the suppositions of a Navy of fixed strength, the promotion points for all individuals with a certain length of service in a particular category to the next category can be calculated as follows:—If a certain number  $n$  enters service each year (the same number going out of service in that year), the relative number of men with various lengths of service can be easily known as follows.

The number with zero year service =  $n = x_0$

The number with 1 year service =  $0.98 n = x_1$

The number with  $r$  years service where  $0 < r < 15 = (0.98)^r \cdot n$

The number with  $r$  years service where  $10 < r < 15$   
 $= (0.98)^{10} (0.985)^{r-10} \cdot n$

The number with  $r$  years service where  $15 < r < 20$   
 $= (0.98)^{10} (0.985)^{r-10} (0.70) \cdot n$

The number with  $r$  years service where  $20 < r < 25$   
 $= (0.98)^{10} (0.985)^{r-10} (0.70) \cdot (0.90) \cdot n$

Now if a graph is plotted between  $x_r$  and  $r$  the area under this curve should give practically the total strength of service neglecting few odd people who may specially be permitted to work for longer than 25 years. Knowing the strength of the service, the normalizing factor  $n$  in above can easily be determined. For purposes of following calculation  $n$  can be regarded as unity.

If we determine  $r_1$ , for which the areas on the left side of the ordinate at  $r_1$ , in the graph described above, is 70 per cent of the total area then  $r_1$  would be the point at which all seamen of  $r_1$  years of service should be promoted to Leading Seamen. Similarly  $r_2$  and  $r_3$  for promotion to Petty Officers and to Chief Petty Officers can be determined. From such a procedure  $r_1$ ,  $r_2$  and  $r_3$  are seen to be 14, 19, 23 years approximately.

**Relative Strength of Cadres**

Now if such simple provision for automatic promotion is made, the Service will become highly unattractive. At present the Seamen are getting promotions when they have served for about eleven years. Few years ago people only with about six years service were getting promotion. This happened because of the sudden expansion in the Navy and some early promotions will be possible for another few years. For a static Navy of the distant future, first promotion after 14 years might make a naval career somewhat unpopular. An acceptable

\* The term "Seamen" is used in this paper to mean both OD as well as AB rates. OD rates automatically become AB rates after 3 years of service.

figure would be perhaps 10 years and also it should be studied if proportion of the ordinary seamen in the whole service can be somewhat reduced. A second step can be that every seamen of ten years service is not promoted but only the top few are promoted and the rest are asked to compete next year. In this manner upto four chances (10, 11, 12, 13 years) can be given. The proportion of promotions can be fixed to assure adequate relative strength of leading seamen and ordinary seamen.

Regarding first step it is realized that with accent on complicated equipment, better trained sailors with technical experience will fill relatively greater number of jobs and in an ideal way one could think of future relative strengths to be:

Seamen	..	..	..	..	..	50%
Leading	..	..	..	..	..	25%
Petty Officers	..	..	..	..	..	15%
Chief Petty Officers	..	..	..	..	..	10%

Out of the higher categories the supervisory jobs would be taken up as follows:

Leading	..	..	..	..	..	12.5%
Petty Officer	..	..	..	..	..	10%
Chief Petty Officers	..	..	..	..	..	5%

the balance of the strength being taken up in specialist technical jobs not requiring supervision of other persons to any great extent.

However, leaving aside such future proportions, it was felt that the immediate prospects were that relative strengths would be modified as follows:—

Seamen	..	..	..	..	..	65%
Leading Seamen	..	..	..	..	..	20%
Petty Officers	..	..	..	..	..	10%
Chief Petty Officers	..	..	..	..	..	5%

**Proportion of selected candidates available for any promotion**

Now equations can be set up to determine the proportion of successful candidates to total that are ready for any promotion after a particular length of service. Let  $\alpha$  be this proportion for first promotion. Then the total number of seamen in service, assuming that no ordinary seaman is retained in service if he has served for 20 years without getting promoted, is given by the expression:

$$\int_0^{10} x_r dr + (1-\alpha) x_{10.5} + (1-\alpha)^2 x_{11.5} + (1-\alpha)^3 x_{12.5} + (1-\alpha)^4 \int_{13}^{20} x_r dr$$

and this expression should be equal to  $0.65 \int_0^{20} x_r dr$ . The expression is obtained

assuming that a proportion  $\alpha$  gets promoted to Leading after 10 years, 11 years, 12 years and 13 years of service. Solving above equation gives  $\alpha = 0.3$ , that is, pass percentage for promotion to Leading should be only 30 per cent and each seaman will have four chances to compete. It is not difficult to show that this is a fairly good percentage and most of the seamen will be promoted, only about 14 per cent wasting out as seamen after 20 years of service.

Similarly by setting up an equation for total number of leading seamen, the proportion  $\beta$  for promotion of seamen to petty officers can be determined. It is assumed that the first chance would be given when total length of service (seaman + leading) of a leading seaman is 15 years and then there are two more chances, viz.; there are three chances after 15, 16 and 17 years service. The equation is

$$\alpha \int_0^{15} x_r d_r + (1-\alpha)\alpha \int_0^{15} x_r d_r + (1-\alpha)^2\alpha \int_0^{15} x_r d_r + (1-\alpha)^3\alpha \int_0^{15} x_r d_r \\ + p\alpha [1 + (1-\alpha) + (1-\alpha)^2 + (1-\alpha)^3] [(1-\beta) x_{15.5} + (1-\beta)^2 x_{16.5} + \\ (1-\beta)^3 \int_0^{25} x_r d_r] = 0.20 \int_0^{25} x_r d_r$$

The factor  $p$  is a correction for the fact that though overall cutting down to 70 per cent takes place at signing up time after 15 years of service, the leading seamen do not go down in the same ratio, the factor  $p$  is estimated to be 1.25 which means that the leading seamen will sign up at a better rate. Solving the above equation we get  $\beta = 0.36$ .

Now the equation for Petty Officers can be written down for determining the proportion  $\gamma$  for promotion of Petty Officers to Chief Petty Officers at total length of service of Petty Officers (seamen+leading+Petty Officers) being 20 years (let). This comes out to be 0.75. Again assuming a factor  $p$  as 1.25 as before and a factor  $p'$  for second signing up as 1.1. With this  $\gamma$ ., the strength of Chief Petty Officers with various lengths of service (20 to 25 years) should be 5 per cent of total. In case this is not so we can adjust the point of promotion and the value of  $\gamma$  slightly. In our case the simultaneous equations are practically satisfied with  $\gamma = .75$ , promotion point  $r_3$  being 20 years and  $p = 1.25$  and  $p' = 1.1$ . For ready reference the simultaneous equations are given below:—

$$\text{(writing } K \equiv \alpha [1 + (1-\alpha) + (1-\alpha)^2 + (1-\alpha)^3] \text{ and } K' \equiv K \beta [1 + \\ (1-\beta) + (1-\beta)^2])$$

we have

$$p.K.\beta. \left[ \int_0^{20} x_r d_r + (1-\beta) \int_0^{20} x_r d_r + (1-\beta)^2 \int_0^{20} x_r d_r \right] \\ + p' K' (1-\gamma) \int_0^{20} x_r d_r = 0.10 \int_0^{20} x_r d_r$$

and

$$p' K' \gamma \int_0^{25} x_r d_r = 0.05 \int_0^{25} x_r d_r$$

### Conclusion

Supposing subsequent signing up to be only at 15 years and 20 years of service and normal total service to be 25 years, with given wastage rates during this service in the steady state with assumed relative strength of 70 per cent, 15 per cent, 5 per cent of seamen, Leading, Petty Officers and Chief Petty Officers, automatic promotion points after a certain length of service come out to be 14, 19, and 23 years respectively. To make the promotion prospects look brighter it was decided that the relative strengths of seamen and Leading Seamen be altered to 65 per cent and 20 per cent. There should be four chances of promotion to Leading seamen after 10, 11, 12, 13 years of service, and there should

be 3 chances of promotion from Leading Seamen to Petty Officers after 15, 16, 17 years of service and there should be one chance of promotion to Chief Petty Officer after 20 years of service. The proportion of successful candidates in each promotion examination be  $\alpha$ ,  $\beta$  and  $\gamma$  for promotions to Leading, Petty Officer and Chief Petty Officer respectively. Under these assumptions the values are  $\alpha = .30$ ,  $\beta = .36$  and  $\gamma = .75$ . Roughly one may regard  $\alpha$  and  $\beta$  as 33 per cent and  $\gamma$  as 75 per cent.

It is true that at present first promotion point is around 6 years and few years ago it was only about 3 years. But this is due to continuous expansion of the navy. For next five years when the navy is likely to keep expanding, this promotion point will still remain low. But the above calculation is only a pointer towards best solution when steady state has been reached and this may help both the executive authorities as well as the seamen involved.

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