A Preliminary Study on the Selection and Employment of Pressure-resistant Talents in Modern State-Owned Industrial and Technological Enterprises

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Abstract. For enterprises, talent selection is an important job. By analogy with the relevant theories of engineering materials, this paper analyzes the relationship between the working pressure and working status of modern enterprises' talents, obtains the formulaic evaluation criteria and designs the relevant selection methods based on this, which provides important reference for the selection of modern state-owned industrial and technological enterprises.

Keywords: pressure resistance · talent selection · modern state-owned industrial and technological enterprises

1 Introduction

At present, enterprise recruitment is an important part of enterprise production. Relevant research has been carried out in the field of human resource recruitment [1–4].

Especially through the establishment of various recruitment concepts and models, the recruitment of talents is scientific from multiple perspectives [5–13].

People who can finish work continuously and efficiently for a long time under high intensity and high pressure are called pressure talents. For modern state-owned industrial and technological enterprises, how to select pressure talents and how to improve the work sustainability of talents have become two important issues. In this regard, various units have put forward a series of measures and made breakthroughs in family and personal development. For example, solve the problem of separation between husband and wife, solve the difficulty of children going to school, improve the accommodation conditions of single employees, and promote the personal development of employees with the Party and Youth League as the first priority. The implementation of these measures has improved the pressure capacity of enterprise talents and has an indispensable positive significance for the improvement of enterprise efficiency. However, more research and practice have not been carried out on the selection of pressure-resistant talents. According to the characteristics of modern state-owned industrial and technological enterprises, this paper will provide some ideas for the selection and employment of such talents.

N. Akhtar et al. (Eds.): PMIS 2023, AHIS 8, pp. 1196–1203, 2023.
https://doi.org/10.2991/978-94-6463-200-2_126

Chinese state-owned industrial science and technology enterprises widely adopt the institutional structure, which has certain stability compared with various companies in society. For a long time, the staff turnover rate is low, and employees will be in a working environment and system with little change for a long time, even for a lifetime. In addition, enterprises have undertaken more and more tasks. At present, the work intensity of modern state-owned industrial and technological enterprises is far higher than that of ten years ago. It can be predicted that this situation will not be improved in the next few years. At the moment when China's state-owned industrial science and technology take off, the state-owned industrial science and technology talents are faced with a variety of work contents and extreme work pressure.

Therefore, state-owned industrial and technological enterprises should consider the following two aspects when selecting pressure-resistant talents:

1. Be able to work efficiently for a long time under high pressure;
2. Be able to work under high pressure for a long time without generating extreme phenomena such as disgust and boredom of work, refusal to accept tasks or even giving up work.

How to select the pressure-resistant talents suitable for the development of enterprises, we might as well learn from the material science theory in the engineering field.

2 Stress-Strain Curve of Material Mechanics

In material mechanics, the ideal stress-strain curve of common metal materials is shown in Fig. 1. The main parameters for evaluating material properties are elastic modulus, yield stress and fracture stress. The whole stretching process can be divided into the following stages:

1. Linear phase

At the initial stage of tension, the stress-strain curve is a straight line, at which time the curve has a fixed slope. In material mechanics, this value is called the elastic modulus of the material.

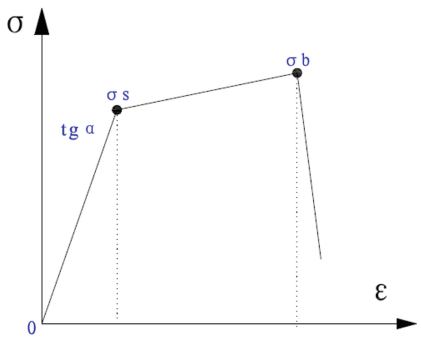

Fig. 1. Stress-strain curve of material mechanics

2. Yield stage

When the stress reaches a certain value, the relationship between stress and strain is no longer proportional, and the curve will have horizontal segments (or near horizontal segments). The observation of this horizontal line segment shows that the stress basically remains unchanged, but the strain changes greatly. At this time, the material loses the ability to continue to resist deformation, which is called “yield”. The stress required to reach the yield stage is the yield stress.

3. Fracture

After yielding, if the material continues to bear tensile stress, when the stress reaches the breaking stress, fracture will occur. It can be described in the figure that the stress decreases rapidly and the strain increases little. After fracture, the material will fail completely.

3 Work Efficiency - Work Pressure Curve During Talent Working Period

The working condition under pressure is an important sign of evaluating pressure talents. Therefore, combined with the stress-strain curve of materials, the work efficiency - work pressure curve of pressure talents is drawn.

The work efficiency - work pressure curve can be compared with the stress - strain curve of stainless steel, which divides the work process of talents under pressure into three stages:

1. Free stage (O-A section)

At the initial stage of work, the work pressure is low, and the work efficiency increases proportionally with the increase of work pressure. The slope of the straight line in O-A section is defined as "efficiency improvement ability". The greater the slope, the faster the work efficiency will be improved. At present, the simple knowledge assessment of recruitment talents can be summed up as the test of efficiency improvement ability.

2. Low efficiency stage (A-B section)

When the working pressure continues to increase to point A in Fig. 2, the working efficiency and working pressure no longer maintain a direct relationship. In this level

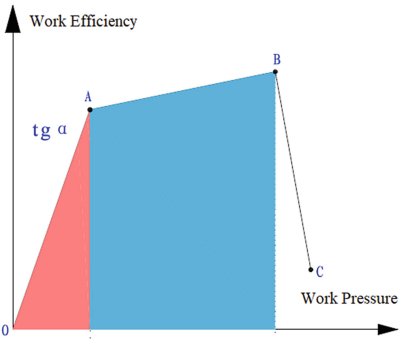

Fig. 2. Work Efficiency - Work Pressure curve during talent working period

segment, the increase of working pressure does not lead to a significant increase in working efficiency. At this time, it is inefficient working state, and the corresponding working pressure at point A is inefficient pressure. For employees, the maximum working state can be basically maintained at this time, but the actual working efficiency is gradually decreasing with the increase of working pressure. This stage is also the best stage for enterprises and employees to actively adjust their working state externally.

3. Conflict stage (B-C section)

If there is not enough effective external intervention to adjust at the low efficiency stage, with the further increase of work pressure, when it reaches point B in Fig. 2, employees will feel tired of unreasonable or even reasonable work. At this time, the work pressure is called resistance pressure. The work pressure increases little but the work efficiency decreases rapidly. In case of conflict, even if we can restore our work status through decompression and other means in the future, it will also cause adverse effects such as slow improvement of talent's work status and premature entry into inefficient stage due to the shadow of conflict.

4. Basic meaning of curve

If the total workload is expressed as φ, Work efficiency is expressed as η, the working time is expressed as T. There are:

$$\varphi = \eta \times t \tag{1}$$

If the working pressure P is proportional to the working time T, that is:

$$P = k \times Tk \text{ is constant} \tag{2}$$

Substitute formula (2) into (1):

$$\varphi = \eta \times \frac{P}{k} \tag{3}$$

set up "$\eta \times p = A$", there are:

$$\varphi = \frac{A}{k} \tag{4}$$

Since k is constant, the total workload can be represented by the curve coverage area A in Fig. 2 φ.

4 Test Method for Selection and Employment of Pressure Talents

In order to test the pressure-resistant talents, they should go through the process of data quantification, curve drawing, data judgment, etc.

4.1 Quantification of Work Efficiency and Work Pressure

The content of this paper is the abstract indicators such as work pressure and work efficiency. In the actual operation process, it is necessary to formulate a typical work pressure expression mode, which can be quantified and analyzed.

4.1.1 Quantification of Work Efficiency

Work efficiency can be directly quantified by dividing the total workload by the working time, which is the quantized value.

4.1.2 Quantification of Working Pressure

Determination of Pressure Impact Factors To quantify work stress, the main influencing factors should be analyzed first. According to the relevant literature [14], the survey of scientific researchers in Shanghai scientific research institutions shows that at present, the vast majority of scientific researchers are in high tension. The paper has identified nine sources of stress for scientific researchers, and the most significant ones are the impact of scientific research activities on individuals and scientific research requirements. In terms of the impact of scientific research activities on individuals, the factor item with the largest load factor is "having to work for a long time". In terms of scientific research requirements, the factor item with the largest load factor is "work requires high level of innovation". The industrial and technological enterprises staff also face the same problem. Long-time overtime has become a common occurrence. The various practical problems faced in the actual work are also a powerful challenge to the innovation ability. In this paper, "long time work" and "innovative work" are considered as the main quantitative impact factors of work stress.

Time Characteristics of Pressure Influence Factors Assuming that the influencing factors of work stress - "long time work" and "innovative work" are independent and can be superimposed, formula (2) can be transformed as follows:

$$P = a + b = k \times T \tag{5}$$

Among them, a is the impact factor of "long time work" on work pressure, and b is the impact factor of "innovative work" on work pressure. It can be seen from formula (5) that in the test process, the influence factor a of "long time work" and the influence factor b of "innovative work" are designed to increase proportionally with the working time T, where a itself has the time proportional characteristic.

"Innovative work" increases in proportion to the working time T, so the work to be completed should be scored according to the innovation. In the test process, it shall be used according to the principle of innovation from low to high and increasing evenly.

4.2 Working Efficiency - Working Pressure Curve Drawing

After quantifying the working pressure and working efficiency, use the interpolation principle to draw the curve, as shown in Fig. 3. Select a number of points on the horizontal axis working pressure, which are represented by serial numbers 1–11. The working efficiency measured under each working pressure is represented by a hollow circle in the figure. Then, take the average of the working efficiency of this hollow circle and the previous hollow circle, and show it as a solid circle in the figure. Then connect the solid circles to form the working efficiency - working pressure curve. Point C shall be at the last working test pressure and indicated by a solid circle. The working efficiency - working pressure curve can be obtained by connecting each solid circle.

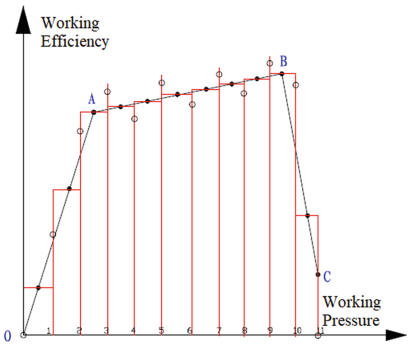

Fig. 3. Working Efficiency - Working Pressure curve drawing

4.3 Data Determination

4.3.1 Efficiency Evaluation Method

According to Fig. 2, the slope of the curve in the free phase is the "basic work efficiency". Although the method introduced in Chapter IV can obtain the curve of the whole working state of the candidate, for the selection and employment of jobs that will mainly bear low pressure in the future, it is mainly to examine the indicators that are easy to affect the work efficiency under low pressure, such as the candidate's early knowledge accumulation and learning ability. The original general knowledge testing method can still be used.

For the selection of jobs that will mainly bear low pressure in the future, we should focus on the rising stage of the pressure curve. The work is mainly in emergency state, and it is also suitable for such evaluation method when the work needs to be completed successfully in a short time.

4.3.2 Total Workload Method

The total workload method can be used to judge the state between inefficient work and conflicting work. Many employees of industrial and technological enterprises are in the stage of inefficient work, so they have to increase the total workload through overtime and other ways of extending working hours. For the assessment of workload completion in inefficient work, you can hand over a number of unrelated tasks to the candidate after the pressure test to inspect their completion.

If you do not consider the status of the applicant, the most important thing for the enterprise is the workload completed by the employee. In Fig. 2, the candidate's ability to work under pressure can be judged according to the area covered by the work efficiency - work pressure curve. Using the derivation of formula (1) –(4), the total workload can be obtained φ。

5 Conclusions

If the national industrial undertaking is compared to an overall structure, the scientific and technological talents are equivalent to the materials for building this structure. After analyzing the characteristics of modern state-owned industrial and technological enterprises, this paper obtains the talent selection criteria, and obtains the work efficiency - work pressure curve of talent during the working period according to the stress-strain curve of material mechanics. Combined with the key indicators of the curve, the specific method for drawing the curve and the data judgment method are proposed. The selection and employment model and method of pressure-resistant talents established in this paper are scientific and realizable, and have important guiding significance in the future talent recruitment work.

References

1. Pei, J.(2006) Research on Human Resource Recruitment. SCI-TECH Information Development&Economy,16(2):207–209. https://doi.org/10.3969/j.issn.1005-6033.2006.02.120.
2. Liu, W.(2006) Comprehensive ways to improve the effectiveness of talent recruitment. Pioneering with Science & Technology Monthly, 19(8):135-136. https://doi.org/10.3969/j.issn.1672-2272.2006.08.072.
3. Zhang, J.(2011) Problems and countermeasures of human resources recruitment in small and medium-sized enterprises. Journal of PUER University, (4): 35-40. https://doi.org/10.3969/j.issn.1008-8059.2011.04.010.
4. Zhang, H.(2012) Discussion on the problems and solutions of enterprise talent recruitment interview.Journal OF Chongqing Electric Power College, 17(2):55–58. https://doi.org/10.3969/j.issn.1008-8032.2012.02.021.
5. Yang, Q.(2010) Research on recruitment model based on person-organization matching. Modern Business,23:96-98. https://doi.org/10.3969/j.issn.1673-5889.2010.23.062.
6. Xiao, W.(2004) Analysis on Innovation of Enterprise Talent Recruitment. Modern Management Science,9:11-12. https://doi.org/10.3969/j.issn.1007-368X.2004.09.004.
7. Liu, X. (2015) An Analysis of Effective Recruitment Strategies for Growing Enterprises. Small and Medium-sized Enterprise Management and Technology, (6):14-15. https://doi.org/10.3969/j.issn.1673-1069.2015.06.011.
8. Chen, SH. (2012) Research on Enterprise Talent Recruitment Strategy. Foreign Investment In CHINA, (2):260. https://doi.org/10.3969/j.issn.1004-8146.2012.2.190.
9. Jiang,J.(2008)How to solve the problems in human resource recruitment of small and medium-sized enterprises. National Business Situation, (12):46-47. https://doi.org/10.3969/j.issn.1009-5292.2008.12.019.
10. Ou,Sh.(2010) Discussion on the recruitment mode of scientific and technological talents in enterprises.Da Zhong Ke Ji,(10):217–218,206. https://doi.org/10.3969/j.issn.1008-1151.2010.10.116.
11. Chen, J.(2005) New progress in the research of talent evaluation methods. SCI-Technology and Management,7(3):113–114,117. https://doi.org/10.3969/j.issn.1008-7133.2005.03.039.
12. Chen, W.(2006) Enterprise practice of building competency model of human resource management personnel. Science & Technology Progress and Policy, 23(3):40-42. https://doi.org/10.3969/j.issn.1001-7348.2006.03.010.
13. Zhu, J.(2006) Research on recruitment effectiveness. Enterprise Economy, (7):77-79. https://doi.org/10.3969/j.issn.1006-5024.2006.07.026.

14. Zhu, CH (2007). Research on the Work Stress of Scientific Research Personnel in Shanghai Scientific Research Institutions. Public Management Research, (0):152–172. https://d.wanfangdata.com.cn/periodical/ChlQZXJpb2RpY2FsQ0hJTmV3UzIwMjMwMTEyEg5RSzIwMDcwMjE0MjcxNBoIN2hqcW91aGc%3D.