

Aging algorithm for DC Train Facilities

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Abstract. Railway equipment is determined by rating the state of which it is necessary to determine the rating algorithm. North Korea graded state determination algorithm is to determine the current state by rating the technique requires a programmable. The algorithm the grades in the country program is not developed in each case depending on various factors, by examining the part so that time and resources included in the algorithm. Therefore, in this research, railway equipment to achieve through services to improve the efficiency of the power train end goal of field application technology development and practical evaluation system.

Keywords: Aging algorithm, DC Train, Facilities.

1 Introduction

The current collector in contact with the electric vehicle for supplying power to the overhead wire catenary equipment such as the equipment and its parts are collectively referred to as the catenary. Directly supplying the electric power to the electric vehicle such as a trolley catenary equipment and this electrical and mechanical protection of sensitive or adjustment device and catenary support structure that is composed. The electric vehicle is a load fluctuations should have a sufficient capacity. Electric vehicle will not interfere with the vibration and strong winds, even at the same time maintaining sufficient mechanical separation will be less vibration and shaking[1]. A feed line to supply electricity to the synthesis catenary. Feeding method, such as in the case of AT withdrawal catenary substation feeder (TF), the main connection between the transformer and auto-transformer auto-transformer feeder (AF) and the Fed BT or BT shares in the secondary side of the transformer, from catenary tablet feeder (PF) and the like. Catenary height of the rail surface in direct contact with the electric car is being supplied electricity refers to the lower catenary

train a maximum of regulatory power plant facilities 5,400 mm, standard 5,200 mm, 5,000 mm and a minimum but can be up to 4,850 mm in exceptional cases, Gyeongbu Dongdaegu and Busan tunnel between the rigid sections is a section of 4,750 mm to 4,750 mm or more depending on the characteristics of the electric vehicle, which can be controlled[2,3]. In this paper, railway equipment to achieve through services to improve the efficiency of the power train end goal of field application technology development and practical evaluation system.

2 Catenary and messenger wire

Catenary supply electricity because direct contact with the electrically and mechanically to the catenary is worn. Electrical abrasion of the pantograph and catenary caused by incomplete contact or Ethan and the arc will cause the electrical. Changes in the slope of the catenary point, places of improper tension, the sliding surface irregularity problems. Mechanical abrasion (abrasion cutting) are mechanical friction between the pantograph and catenary and impact generated in accordance with the pressure of the pantograph will imagination is large, the strength of the material, the mechanical abrasion is often proportional to the coefficient of friction at high speed slows to less . Interval, typically alternating electric current is smaller than the mechanical abrasion and abrasion are large and the direct current interval are reversed. When the pressure is significantly pantograph imagination, electrical to mechanical abrasion and anti- abrasion reduction is increased. The increase of the pressure imagination decreasing even if the overall abrasion is increased and the mechanical abrasion is reduced. Catenary is a slow period in the sliding surface is badly worn and rough into. High-interval, the pantograph and catenary and increase the contact force fluctuations are likely to occur because of local abrasion. The temperature of the catenary 90°C is closer to the problem, but when the temperature is high, the temperature rise in accordance with the generation of an oxide film is promoted. When the current collector current is smaller in the presence of an oxide film of the catenary effect of the abrasion protection (a kind of lubricating effect) to be. Poor electrical contact with the current collector current is large, but according to a very small and easy to abrasion generation is the cause of the increase. Temperature rise in accordance with changes in the configuration of the parallel section catenary, catenary crossing the line passes, and also increases the abrasion. Abrasion rate is represented by the following formula.

$$\text{Abrasion rate} = \frac{\text{Thickness of catenary abrasion}}{\text{Pantograph passes 10,000 times}} \quad (1)$$

Tilting line is 100°C The tensile strength after heating for 30 minutes without lowering the tensile strength is 100% is retained because the maximum permissible temperature of 100°C Also as an excellent, but somewhat longer continuous

mechanical strength when heated tends to decrease with the repetition of the heating and the tensile strength decreases degradation of the connection region need to be

considered in Fig, 90°C to be the highest allowable temperature. In addition, typically the wires or tensile strength is lowered when the temperature rises. The messenger wire is reduced by friction and mechanical vibration because the tensile strength, corrosion resistance, wear resistance, and strong vibration is preferable. Jogaseon the performance required of the tensile load is greater, but for the catenary wire is used alone, it is not a dropper, hangers, etc. because they are configured in parallel to the mechanical vibration, wear characteristics, and the dissimilar metal contact corrosion of the electrical and chemical characteristics it is necessary to take into account be.

3 Grading step 5 elements

For catenary components are broken down by the absence of regulation, because the rating catenary and messenger wire straight to the deterioration factor comprehensive evaluation of the corresponding entry in the excellent, good, normal, caution, and bad grading step 5. Figure 1 shows the aging algorithm of DC train facilities.

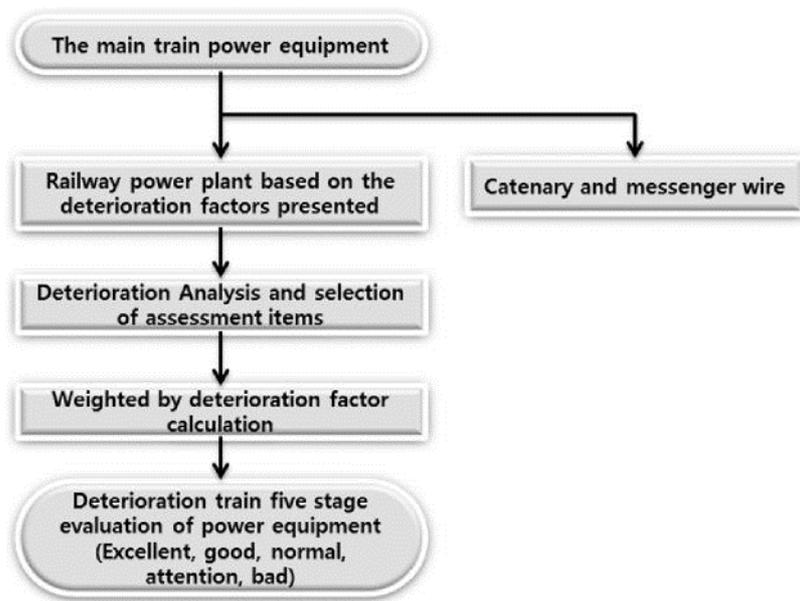


Fig.1. aging algorithm of DC train facilities

Graded to the status of the catenary weight is shown in the table below. Weight is "0", the closer the edge is not affected also affects 0.5 to assume an increasingly aging was calculated weights. At this time was such that the sum of weights. Considering the weight of each factor in each factor with respect to the status of each class in order to catenary scoring criterion graded as excellent component failure in the scoring was divided into five phases. Deterioration of 0.5 points, the larger the closer the more meaning. Figure 2 shows the aging calculated by the state checking.

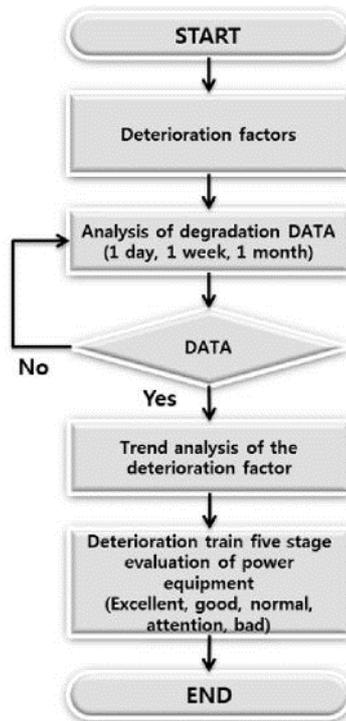


Fig.2 aging calculated by the state checking

Table 1. Weighted grades

Weights grades	Weights
A	0
B	0.05
C	0.1
D	0.35
E	0.5
Total	1

Table 2. Graded criteria

Weights grades	Weights
Excellent	0 ~ 0.15
Good	0.16~0.25
Normal	0.26~0.35
Attention	0.36~0.45
Bad	0.46~0.5

Catenary for predicting the lifetime, this paper presents the wear and temperature degradation catenary factor was set[4].

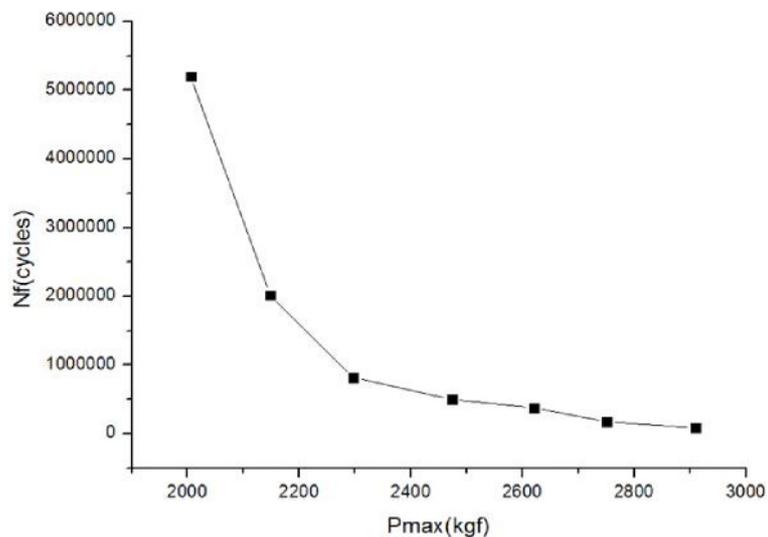


Fig.3. aging of messenger wire by pressure

Figure 3 shows aging of messenger wire by pressure. Messenger wire of the recommended replacement period is 23 years, as shown in the table above the maximum load 2,148 kgf, the same as. For example, 2,148 kgf recovery in the case of the passage of the pantograph 8,110,546 cycles.

4 Conclusion

In this paper, railway equipment to achieve through services to improve the efficiency of the power train end goal of field application technology development and practical evaluation system. The results of this paper Railway equipment aging of

urban rail DC Class discrimination algorithms and programs to improve operational efficiency through the city railway in North Railroad train future economic and efficient replacement of equipment shall be utilized to establish standards relating predicted.

References

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