Code Comparison and Application for Designing Transfer Elevator

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1. Introduction

The Kijang research reactor performs radioisotopes (RI) production, neutron transmutation doping (NTD), and fast neutron flux utilization. The transfer elevator is a structure system and equipment to transport the FM (Fission Molybdenum) target, RI target and FNI (Fast Neutron Irradiation) rig from the spent fuel storage pool to the transfer hot cell. It has a hoisting equipment including rope, sheave, and drum for driving. Since it is not a safety class, it must be designed with applicable codes. In this study, the codes KEPIC MCF [1] and MCN [2] for component design are compared mainly to the difference, and the applicability for the transfer elevator is considered.

2. Methods and Results

2.1 Hoisting Ropes

The hoisting rope shall be proper design and construction for driving the transfer elevator. The codes have requirements related to rope fleet angles for drums and sheaves. Table I and Figure 1 to 3 show the requirements.

Table I: Rope Fleet Angle

Code	Drums	Sheaves
MCF	1 in 14 slope (4°)	1 in 12 slope (4° 45´)
MCN	The operating fleet angle A from the drum to lead sheave shall not exceed 3.5° at the one point during hoisting, except in seldom reached positions where it shall be limited to 4°.	The fleet angles B between the upper sheave and the respective reeved lower sheave shall not exceed 3.5°.

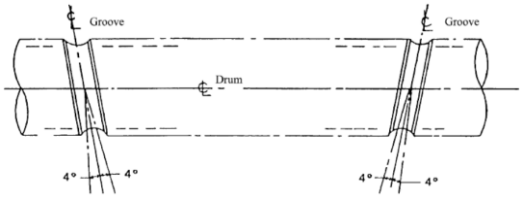

Fig. 1. Rope fleet angles for drums (MCF)

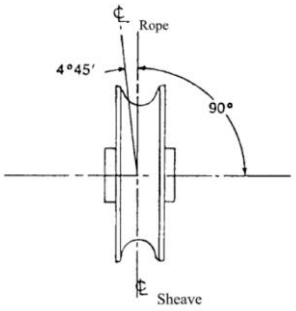

Fig. 2. Rope fleet angles for sheaves (MCF)

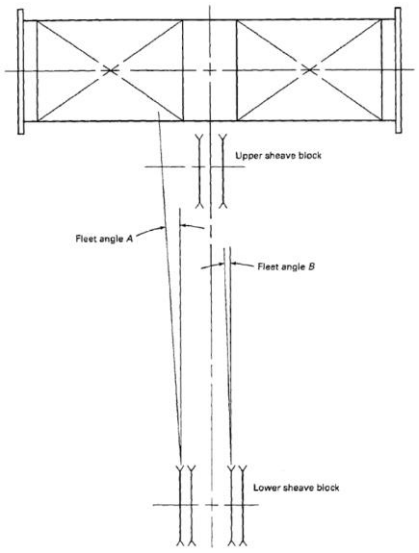

Fig. 3. Rope fleet angles for drums and sheaves (MCN)

For rope fleet angles, it can be seen that the KEPIC MCN is more conservative than the KEPIC MCF.

2.2 Sheave

Table II is a guide for pitch diameter of running sheaves. Smaller sheaves may cause an increase in rope maintenance [1].

Table II: Guide for Minimum Pitch Diameter of Running Sheaves

Code	6x37 Class Rope	6x19 Class Rope
MCF A&B[1)]	16 d	20 d
MCF C[1)]	18 d	24 d
MCN	24 d	30 d

[1)] MCF Class
d: rope diameter

Like the rope fleet angles, the KEPIC MCN is more conservative than the KEPIC MCF.

2.3 Drum

Table III is a guide for minimum pitch diameter of drums. Smaller drums may cause an increase in rope maintenance [1].

Table III: Guide for Minimum Pitch Diameter of Drums

Code	6x37 Class Rope	6x19 Class Rope
MCF A&B	16 d	20 d
MCF C	18 d	24 d
MCN	24 d	30 d

In the case of drums, it matches the requirements of the sheaves. Therefore, the KEPIC MCN is more conservative than the KEPIC MCF.

3. Conclusions

In this study, the code comparison for designing the transfer elevator is performed. From the comparison of the KEPIC MCF and MCN for component design, it can be seen that the rope fleet angle and the pitch diameter of sheaves and drums are more conservative in the KEPIC MCN than in the KEPIC MCF. Therefore, it is necessary to understand the background and principles of each requirement and determine the code class to be applied for designing the transfer elevator.

ACKNOWLEDGEMENTS

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REFERENCES

[1] KEPIC MCF, Fossil Power Plant Cranes, Korea Electric Association, 2005.
[2] KEPIC MCN, Crane for Nuclear Facilities, Korea Electric Association, 2005.