



Óbuda
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Mathematical model based decision-making methods in maintenance

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Introduction : -

- ▶ The durability of machine is directly proportional to the quality. Which required proper maintenance on time. So, this study helps to give the decision-based maintenance methods with the help of mathematical model.
- ▶ In this literature review, I studied major topics which causes aging and evaluated them as per the reasons and their methods to predict the lifetime.
- ▶ I found the main problems in this study of maintenance and how to give decision-based maintenance methods by means of modelling.

- ▶ There are 2 problems which is to be taken into consideration.
 1. How to find lifetime reliability of machining system?
 2. How to do modelling with effective methods in framed time?

- ▶ Based on aging data, I will create a mathematical model with the help of linear or non-linear regression model or any mathematical model which can coordinate with regression model and can develop theoretical measurements

Classification of Articles: -

No.	Topics	Numbers of Article
1	Aging	39
2	Wear and Tear	41
3	Erosion and Corrosion	12
4	Modelling and mathematical Modelling	20
5	Maintenance Management	9

Year of Publication	No of Articles
2000	1
2006	1
2008	1
2009	2
2010	3
2011	2
2012	3
2013	3
2014	3
2015	4
2016	6
2017	6
2018	17
2019	26
2020	22
2021	1

Name of Journals	No. of Articles
ELSEVIER	30
IEEE	40
SPRINGER	13
IOP	7
Electrical Insulation Conference (EIC)	2
Insucon	1
Cogent Engineering	1
MDPI Journal	1
Russian Engineering Research, STIN	1
Pleiades Publishing, Ltd, Russia	1
American Scientific Publisher	1
Transaction of Femena	1
Wiley	1
IJETER	1

I divided this literature review in 5 major topics which briefly illustrates the proposed topic.

1. Aging
2. Wear and Tear
3. Erosion and Corrosion
4. Modelling and Mathematical Modelling
5. Maintenance Management

▶ Aging is the main topic which involves all the factors to determine the functional life which are ;

1. Material properties
2. Application
3. Environment

▶ Finding failure and modelling can be useful in this condition.

▶ Wear and tear are the basic phenomenon in the field of maintenance. Most common method was pin on disc method, FEM and SEM for examination.

- ▶ Erosion and Corrosion is the same cause for wear and tear. So basically, both are connected by means of causes and preventive methods.
- ▶ Modelling and mathematical modelling is mainly for finding the failure and it is preventive method. Regression analysis and neural network are most common method used.
- ▶ Maintenance management is an important factor to determine the model-based decision method.
- ▶ Hence these all are connected to each other with respect to their methodology.

Framework: -

- ▶ Firstly, I collected the all-relevant research papers.
- ▶ All the papers are summarized as per methods, results and summary.
- ▶ These articles are then grouped as major topics.
- ▶ With the help of these, root cause analysis can be done and find the better way to model the failure.
- ▶ After modelling , Decision can be made to prevent the maintenance failure.

- ▶ After all these studies, I suggested some modification in this topic.
Which would be:

“ Mathematical Modelling of the Aging in Technical System ”

- ▶ In which Aging is considered as maintenance process and Mathematical Modelling will be based on Decision making methods for aging in technical system.

THANK YOU

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