



# LECTURE # 5

**In this lecture you will learn about:**

- Failure.
- Types of Failure.

**Course Name:**

“Material Testing, Repair & Maintenance”

**Course Code:** CT-245

**Credit Hours:** 3

**Semester:** Summer 2020



# FAILURE

Failure can be define as a breakdown in the operation, function, quality, or appearance of a structure, system, component or material.



# TYPES OF FAILURE

The various types of construction failure are:

- Failure of concrete structure
- Component failure
- Fundamental failure
- Non-progressive failure
- Progressive failure
- Economic failure
- Aesthetic failure
- Structural failure
- Functional failure.



# FAILURE IN CONCRETE STRUCTURE

When the mix components such as cement, sand, and coarse aggregate are of less value or standard, if there is a tendency that the concrete structure will fail because of the inadequate mix ratio of the component.



# COMPONENT FAILURE

Building component tends to fail depending on materials, designs, method of construction, environmental conditions and the use to which the building is put.



# FOUNDATION FAILURE

Foundation failure can cause the building to collapse, foundation is the first element of a building where the construction starts, but when it fails, it can cause many defects in the building including failure or collapse of the building.

Repair of defect in foundation are mostly difficult and very costly, so it is most important to understand the type of foundation failure to avoid them by taking necessary steps before construction starts.



# NON – PROGRESSIVE FAILURE

Non – progressive failure or condition is one that is not likely to deteriorate. Generally, the non-progressive failure of an under-specified component such as building insulation can result from design or construction defects that often do not need to be remediated



# PROGRESSIVE FAILURE

This type of failure is one that is likely to worsen over time. In the legal and insurance fields, a progressive failure that is the basis of a defective work claim is often described as a “continuous loss”. Defects such as expansive soil under a basement slab can cause structural and progressive slab failure and may need to be corrected as soon as possible.





# ECONOMIC FAILURE

This is a condition that result in economic loss or the need to expand unplanned moves to keep a structure, component or system in order. The loss could take the form of excessive maintenance, shortened useful life or added repairs. The installation of improper bearings in an engine can result in the economic failure of the equipment.



# AESTHETIC FAILURE

A condition that renders a component unsightly, significantly detracting from its appearance, can be termed as aesthetic failure, economic consequences often accompany aesthetic failures such as masonry effective, although they may be subjective and difficult to quantify.



# STRUCTURAL FAILURE

This failure is a breakdown in one or more components of the structure system. Such failures include common concrete cracking which may or may not be of any consequences, depending upon the degree of the failure. In addition, structural failures do not always require correction, and, in the context of construction defect claims and litigation, a structural failure without some functional failure or impairment is of limited value. Furthermore, the failure of structural steel connection caused by a design defect could be catastrophic and demands immediate attention.



# FUNCTIONAL FAILURE

This is a condition that renders a component unsuitable or unusable for its intended purpose. The functional failure of a mechanical piece of equipment resulting from a manufacturing defect often require immediate correction.

*Thank You*