

Causes of structural failure



**ASSIGN
BUSTER**

30 January 2007 Causes of Structural Failure Structural failure can be broadly defined as the " loss of the load carrying capacity of a component or member within a structure or of the structure itself" (Structural Failure 2007). This phenomenon is often triggered when the material is stressed to its strength limit causing fracture or excessive deformation. It should be noted that structural failures result from a variety of causes including both technical or physical problems and human error or procedural errors. However, it is important to stress that these causes are often difficult to isolate and quantify because structural failure is often due to a combination of interrelated deficiency.

FitzSimons names " four horsemen of engineering apocalypse" or the factors which causes structural failures: ignorance, incompetence, negligence, and avarice (Carper 10). It should be noted that almost all the aforementioned factors solely attribute failures to engineers. In this regard, it is extremely important to clarify that human errors strongly contribute to the possibility and occurrence of structural failures. Oftentimes engineers make choices which can bring harm and inefficiency in the long run.

There are six procedural causes of structural failure:

1. Site selection and site development errors refer to land use planning errors, insufficient or non-existent geotechnical studies, and unnecessary exposure to natural hazards;
2. Programming deficiencies are unclear or conflicting client expectations or lack of clear definition of scope or intent of project;
3. Design errors involve discrepancy in " concept, lack of redundancy, failure to consider a load or combination of loads, connection details, calculation errors, misuse of computer software, detailing problems including selection

of incompatible materials or assemblies which are not constructable, and failure to consider maintenance requirements and durability, and inadequate or inconsistent specification or quality of work;"

4. Construction errors which is non-conformance to the intended design;

5. Material deficiency which involves material inconsistencies, premature deterioration, manufacturing or fabrication defects; and

6. Operational errors which include alteration to structures change in use, negligent overloading and inadequate maintenance (Carper 15-16).

Any or combination of the aforementioned factors always leads to structural failures. Take, for instance, the failure of hydroelectric project. Investigation may often conclude that this problem arise because of different factors. The failure might involve mechanical and electrical problems, couple with operational errors, design concept deficiencies, and structural errors.

Works Cited

Carper, Kenneth. " Forensic Engineering." CRC Press LLC. 2001