

# FAILURE ANALYSIS & ACCIDENT INVESTIGATION ACTIVITY AT NAL

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## Abstract

Failure represents an adverse situation wherein a component or assembly fails to perform its intended function satisfactorily. In other words, it can be defined as the gap between the expected performance and the actual performance of any component or assembly. The purpose of failure analysis is to establish the mechanism and causes of the failure and to recommend a solution to the problem. Since most times, failures do not “just happen” but are “caused”, determination of the cause for the failure helps to identify as to what exactly went wrong and what needs to be done to avoid similar failures in future. Even the most sophisticated simulation testing cannot adequately duplicate the varied factors and the many unanticipated causes that lead to failure. Hence failure analysis offers the most reliable tool in assuring the safety of the component or an assembly or a system.

Analysis of engineering failures is a formidable, complex, and challenging task, and often very startling even to start with. It is a task that requires information from personnel with expertise in many areas. It also demands tremendous responsibility and coordination on the part of the analyst and a thorough knowledge of materials science supplemented with appreciation and application of related engineering disciplines. The effort is to identify the root cause of failure which not only helps in solving the immediate problem, but provides valuable guidance as to what needs to be done to prevent recurrence of similar failures in a given system or organization. The Materials Science Division of National Aerospace Laboratories has been carrying out failure analysis and accident investigation for a number of aerospace and engineering organizations for more than four decades. Till date, the laboratory has investigated more than 1150 service failure cases of critical nature. The talk will highlight various aspects of this activity with examples drawn from the investigations carried out in this laboratory.