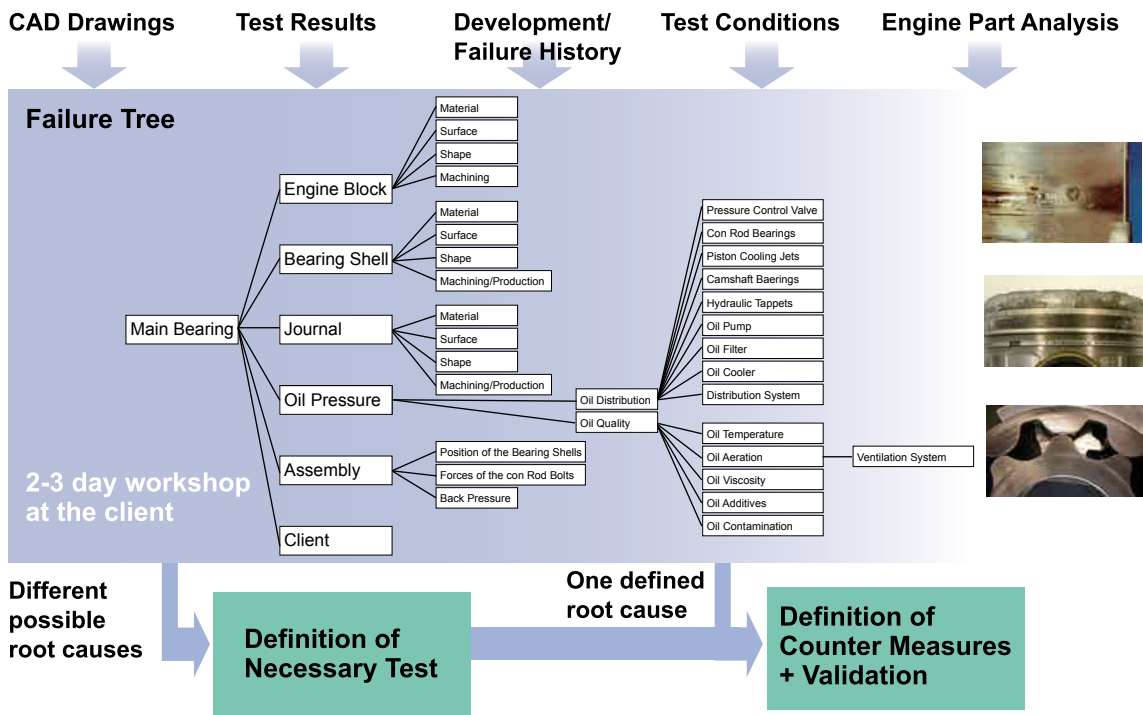


Analysis of Engine Failure and Troubleshooting



Modern strategies for mechanical development are based on intensive virtual optimization, followed by targeted validation and acceptance testing on available high-grade prototypes. Nevertheless, there are often problems, both in the development stages and in production. Examples include oil consumption and blow-by, or even damage to the engine, which can neither be detected with virtual design tools, nor with standard test protocols. At FEV many of those cases are addressed and solved with an adapted failure tree and troubleshooting analysis, which represents a systematic problem solving approach that focuses on all of the interfering impacts and potential root causes of the existing issue.

The basic data contained in this analysis represents a component or trouble-specific failure tree, which focuses the various parameters and possible causes of failure. In many instances this basic data already exists from former investigations and requires only minor adjustments. The most important part is represented by a systematic review of all available information. By screening all of the available information such as engineering drawings, test results, component measurement protocols, development history, engine operating conditions, photos of damaged components, etc. some of the possible causes can already be excluded. In addition, this information is used to develop a basic understanding of the problem or the cause of failure.

Based on this, a 2-3 day workshop is conducted at the customer site, during which this information is discussed and analyzed with the developers and, partially, with the production and/or quality control experts. By systematically questioning and cross-referencing the available information with the fault tree, a continuously better understanding of the problem is achieved, which ultimately serves to define possible sources of error. If the cause of the failure is unambiguous, change measures can be directly defined and then validated in the next step. In the case of multiple causes of failure, they must eventually be evaluated by carrying out standard or special tests. To some extent, this process also results in the development and implementation of new, specialized measurement techniques which provide an unambiguous understanding of the failure and uncover previously missing information and causal relationships. It is only possible to analyze the cause of failure through a very intensive and open exchange of information with all involved developers, since definition of meaningful remedies requires a full understanding of the problem.

We would be glad to assist you with the analysis and solution of your engine failures or problems. Please do not hesitate to contact us for additional information.

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