**Example 1**

A power supply system is composed of an engine, a main fuel supply for the engine and electrical cables distributing the power to the consumers. Furthermore, as a backup fuel support a reserve fuel support with limited capacity is installed. The power supply system fails if the consumer is cut of from the power supply. This in turn will happen if either the power supply cables fail or the engine stops, which in turn is assumed only to occur if the fuel supply to the engine fails.

Solution

A fault tree system model for the power supply is illustrated in figure below also the probabilities for the basic events are illustrated.

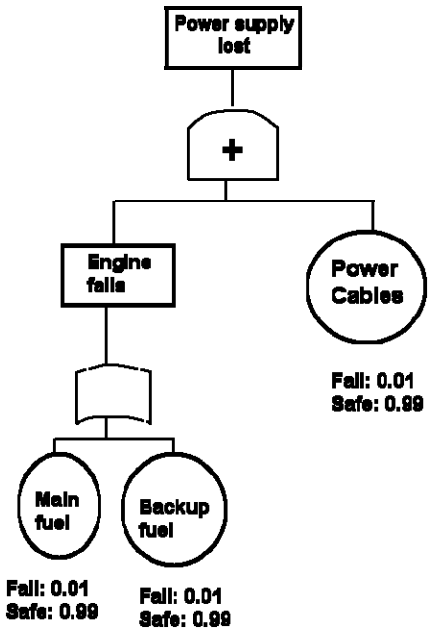


**Figure 1 – Illustration of fault tree for a power supply system**

Use the rules of probability calculus we obtain that the probability of engine failure $P_{EF}$ is equal to (AND gate)

$P_{EF}$ =0.01*0.01 = 0.000

Along the same lines we obtain that the probability of engine failure $P_{EF}$ is equal to (OR gate) equal to (OR gate)

$P_{EF}$ =0.0001+0.01-0.0001*0.01 = 0.0101

**Example 2**

The event tree in figure below models the event scenarios in connection with nondestructive testing of a concrete structure. Corrosion of the reinforcement may be present and the inspection method applied may or may not detect the corrosion, given corrosion is present and given that corrosion is not present.

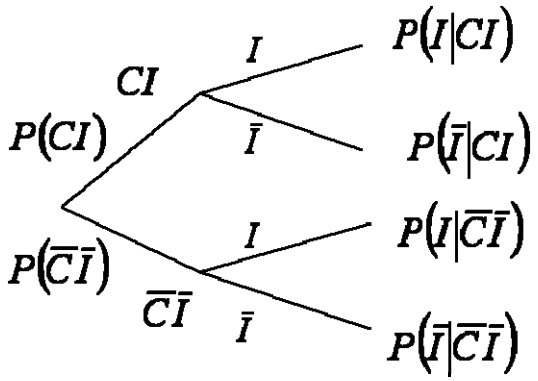


**Figure 2 – Illustration of event tree for the modeling of inspection of a reinforced concrete structure**

In the Figure 7 the event *C/* denote that corrosion is present, and the event / that the corrosion is found by inspection. The bars over the events denote the complementary events. On the basis of such event trees e.g. the probability that corrosion is present given that it is found by inspection may be evaluated.

In many cases the event trees may be reduced significantly after some preliminary evaluations. This is e.g. the case when it can be shown that the branching probabilities become negligible. This is often utilized e.g. when event trees are used in connection with inspection and maintenance planning. In such cases the branches corresponding to

failure events after repair events may often omitted at least for systems with highly reliable components.

In Figure 6.14a combined fault tree and event tree is illustrated showing how fault trees often constitute the modeling of the initiating event for event tree.

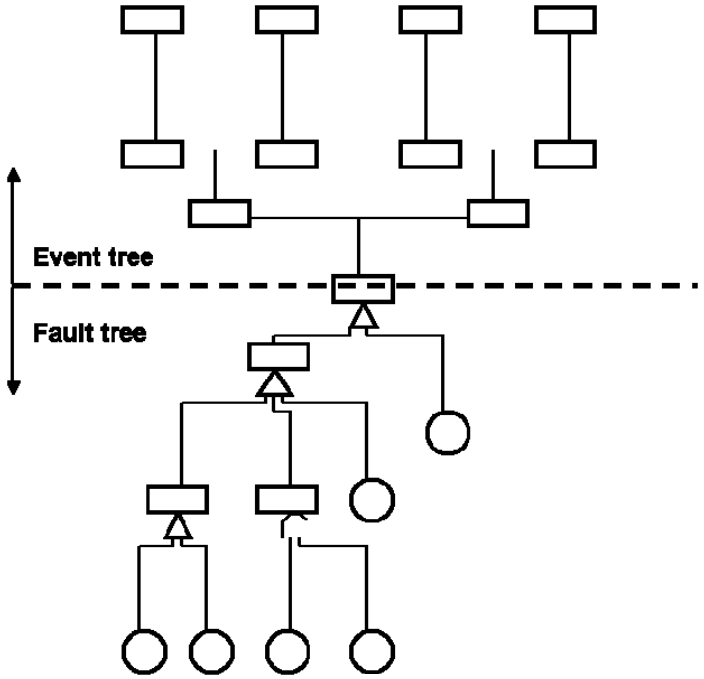


**Figure 3 – Illustration of combined fault tree and event tree**