# Fault Tree Analysis

Fault Tree Analysis was developed by Bell Telephone laboratories in 1962 for U.S. Air Force and later adopted and extensively used by Boeing Company.

Fault Tree Analysis is in fact a technique by which many events that interact to produce other events can be related using simple logical relationship. This technique follow a top - down structure and represent graphical model of the pathways within a system between basic events that can lead to a foreseeable loss event (or a failure) referred to as the **top event**.

The logic symbols the most used are **AND, OR**, etc. – and these symbols are connected by gates. Events that must coexist to cause the top event are described using the **AND** relationship. Alternate events that can individually cause the top event are described using **OR** relationship.

And gate	**Or** gate
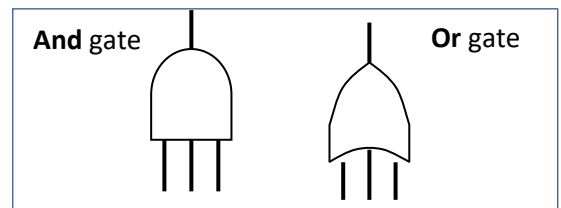
Minimal Cut set is the smallest combination of basic events which, if they occur, will cause the top event to occur.

Basic event	Conditioning event

Basic events are the events that cannot be developed any further and conditioning event are specific conditions or restrictions that apply to any logic gate. There is also calculated, when are known, the relative probabilities of each of the events. The importance of each event can be based on the total probability of the cut set to which the basic event contributes.
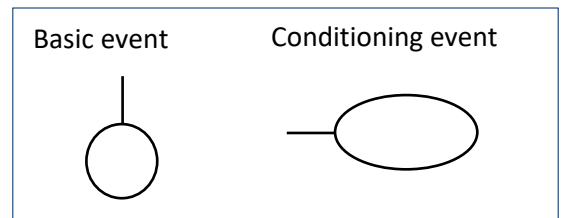
Generally FTA is applied for design of: Nuclear power plants, Transport systems, Communications, medicine, information, etc. FTA is also used to prevent or at least to reduce the potential causes of the top event and to analyze a system to determine his reliability. Not eventually Fault tree analysis is used to protect work for fatal events such as serious work accidents.
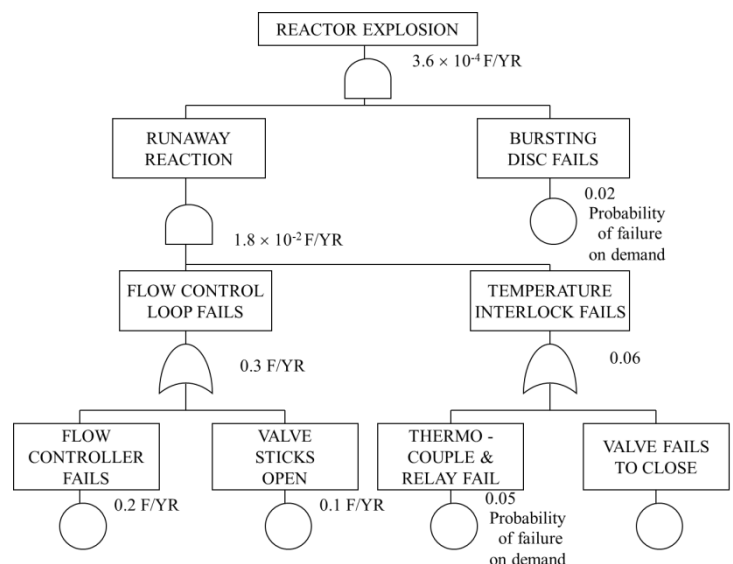
Building an FTA starts with the definition of the top event, purpose, objectives and limitations of the system. Once completed, the FTA becomes a graphical representation of all events that themselves contribute to the emergence of the top event.

REACTOR EXPLOSION

3.6×10^{-4} F/YR

RUNAWAY REACTION

BURSTING DISC FAILS

0.02 Probability of failure on demand

1.8×10^{-2} F/YR

FLOW CONTROL LOOP FAILS

TEMPERATURE INTERLOCK FAILS

0.06

0.3 F/YR

FLOW CONTROLLER FAILS

VALVE STICKS OPEN

THERMO - COUPLE & RELAY FAIL

VALVE FAILS TO CLOSE

0.2 F/YR

0.1 F/YR

0.05 Probability of failure on demand

We invite you to participate in the course offered by Effective Flux to use this method of preventing unwanted events.