Charting for Root Cause Analysis

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Charting Events and Causal Factors

- Objective: Chart the relationship of events, conditions, changes, barriers and causal factors on a timeline.
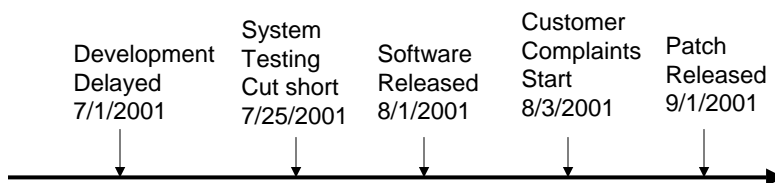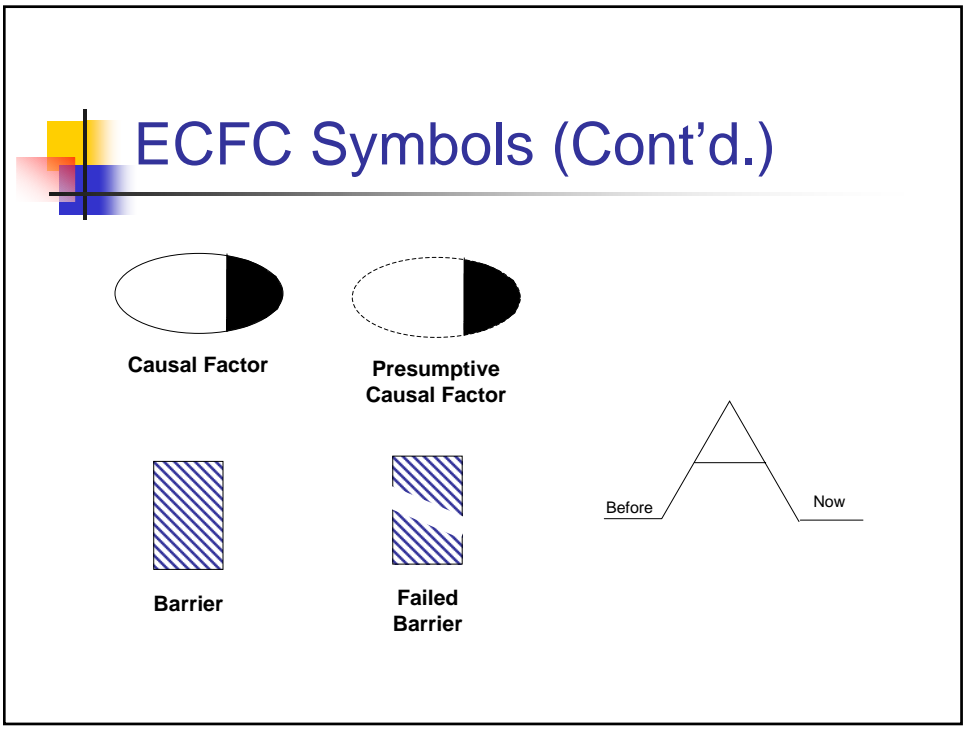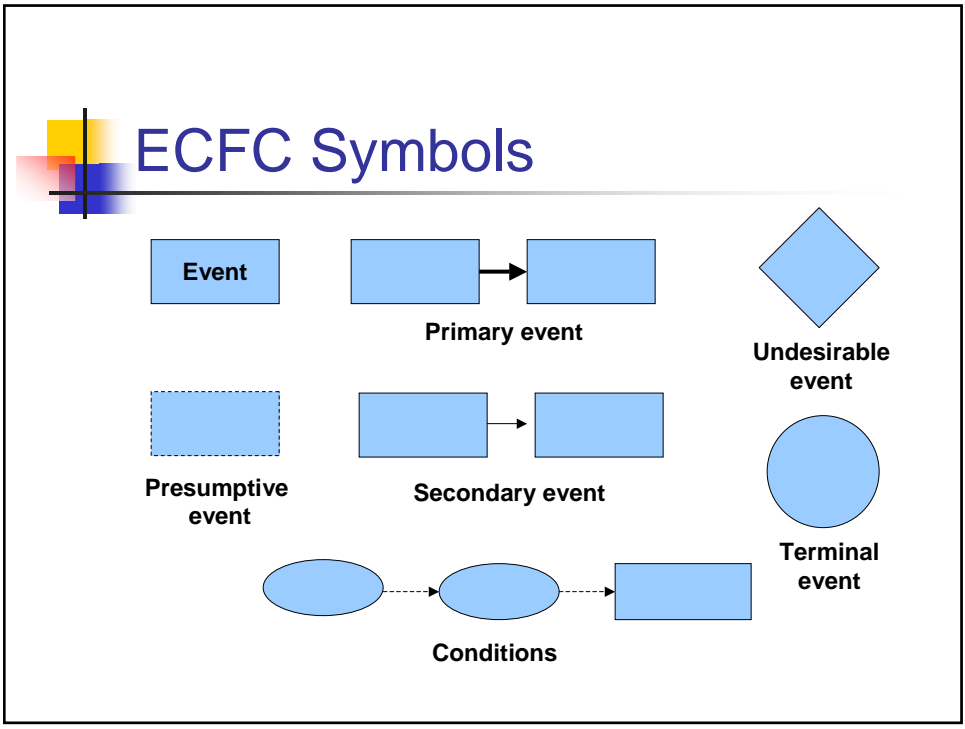- ECFC is the acronym for Event and Causal Factor Chart

Understanding the ECFC

- The heart of the chart is the timeline.
  - The starting and ending points should be adequate to capture all important information to the situation.
- The ECFC is especially helpful in understanding complex situations.
- The graphical nature of the ECFC helps visualize the relationships in the situation.
- The ECFC uses many basic flowcharting symbols, but there are some adaptations.

Event Sequence/Timeline

| Development Delayed 7/1/2001 | System Testing Cut short 7/25/2001 | Software Released 8/1/2001 | Customer Complaints Start 8/3/2001 | Patch Released 9/1/2001 |

ECFC Symbols

Event

Primary event

Undesirable event

Presumptive event

Secondary event

Terminal event

Conditions

ECFC Symbols (Cont'd.)

Causal Factor

Presumptive Causal Factor

Barrier

Failed Barrier

Before
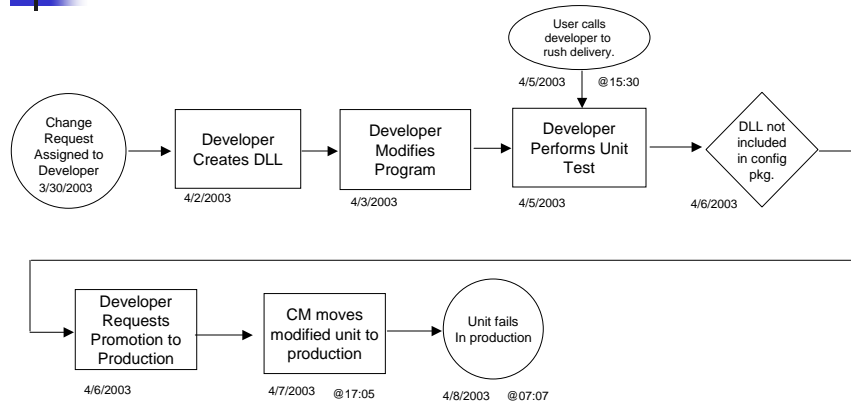
Now

Criteria for Event Description

- Events describe an action, not a condition.
- Events are singular.
- Descriptions are short – one noun and one active verb.
- Events should be described exactly.
- Events should be quantified if possible.
- Events are based on known facts.
- The timeline scope ranges from beginning to end of the situation sequence.
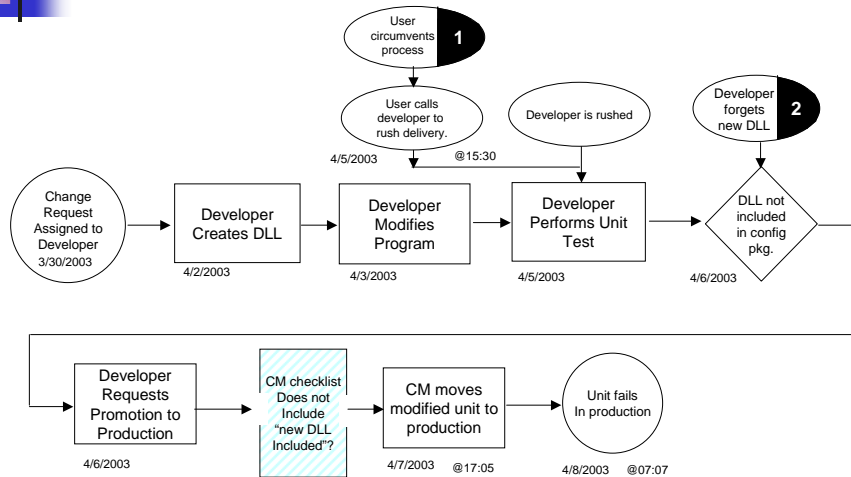- Ordering of events should have a logical flow.

Principles for Cause-Effect Analysis

- All negative events are caused to happen.
  - They are the result of some type failure.
- Undesirable events are caused by additional causes.
  - These are called contributing causes.
- The root cause(s) can be determined by analyzing the cause-effect relationships around a primary effect.

ECFC Example – Version 1

User calls developer to rush delivery.
4/5/2003   @15:30

Change Request Assigned to Developer
3/30/2003

Developer Creates DLL
4/2/2003

Developer Modifies Program
4/3/2003

Developer Performs Unit Test
4/5/2003

DLL not included in config pkg.
4/6/2003

Developer Requests Promotion to Production
4/6/2003

CM moves modified unit to production
4/7/2003   @17:05

Unit fails In production
4/8/2003   @07:07

ECFC Example – Version 2

User circumvents process   1

User calls developer to rush delivery.
4/5/2003   @15:30

Developer is rushed

Developer forgets new DLL   2

Change Request Assigned to Developer
3/30/2003

Developer Creates DLL
4/2/2003

Developer Modifies Program
4/3/2003

Developer Performs Unit Test
4/5/2003

DLL not included in config pkg.
4/6/2003

Developer Requests Promotion to Production
4/6/2003

CM checklist Does not Include "new DLL Included"?

CM moves modified unit to production
4/7/2003   @17:05

Unit fails In production
4/8/2003   @07:07

Summary

- The Event and Causal Factor Chart is an effective way to show the sequence of events and the contributing factors to a negative event.

- Don't get too concerned about the correctness of the symbols. Focus on the understanding of the events.

- There is no standard for this. You might want to customize it for your own purposes.

Bio - Randall W. Rice

- Over 30 years experience in building and testing information systems in a variety of industries and technical environments
- Certified Software Quality Analyst
- Certified Software Tester
- ASTQB Certified Tester – Foundation level, Advanced Level – Test Manager, Test Analyst
- Treasurer of the American Software Testing Qualification Board (ASTQB)
- Chairperson, 1995 - 2000 QAI's annual software testing conference
- Co-author with William E.Perry, *Surviving the Top Ten Challenges of Software Testing*
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