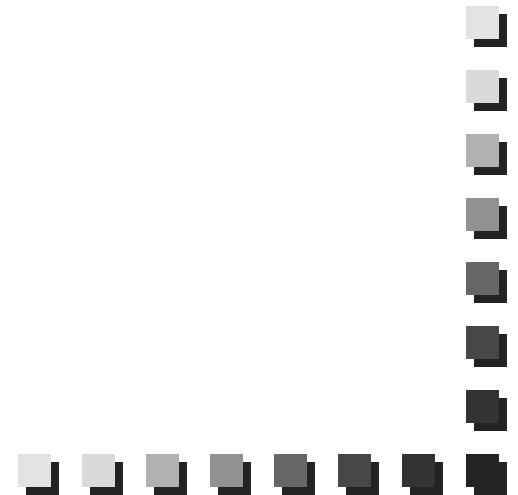


# QRT Quality training

## Phase 1

### Executive Overview



# OUTLINE

## 1. Quality in general

Definition / history

Why quality ?

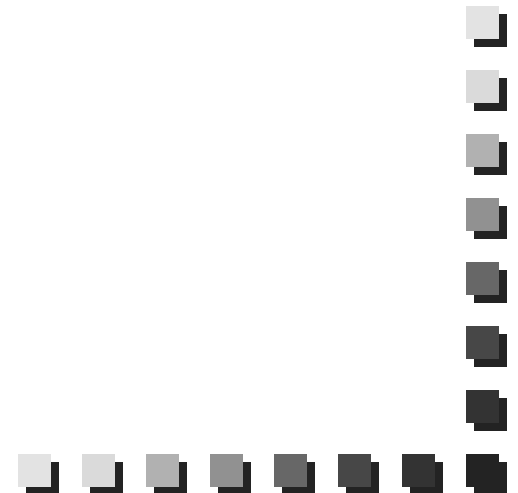
Tools in quality

## 2. QRT at the TERL

Scope

Achievements

## 3. The future



# Quality in general



## Definition

The term quality means different things to different people.

1. Customer-Based	Fitness for use, meeting customer expectations
2. Manufacturing-Based	Conforming to design, specifications or requirements, no defects
3. Product-Based	Something that other similar products do not that adds value
4. Value-Based	Best combination of price and features
5. Transcendent	It is not clear what it is, but it is something good

Definitions 2, 3, and 4 are the definitions traditionally associated with quality in America.

In general, all definitions should be kept in mind when discussing quality.



## Definition

Quality can be seen as a composition of 4 factors:

- Cost
- Time
- Customer satisfaction
- Defects

Airlines	On-time, comfortable, low-cost service.
Health Care	Correct diagnoses, minimum wait time, lower cost, security.
Insurance	Payoff on time, reasonable cost.
Automotive	Defect-free.
Communications	Clearer, faster, cheaper service.

Again, all definitions should be kept in mind when discussing quality.



## History

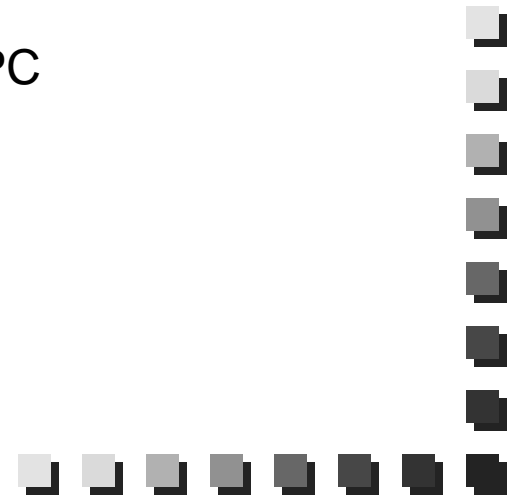
13<sup>th</sup> – 19<sup>th</sup> Century. Guilds were responsible for developing strict rules for product and service quality. Inspection committees enforced the rules by marking flawless goods with a special mark or symbol.

19<sup>th</sup> Century.

- Craftsmanship. Master / student / customer
- Factory production
- Taylor system. Heavy post-production control

20<sup>th</sup> Century.

- Shewhart early in the century. Data analysis, SPC
- Post WW2. Deming / Juran in Japan
- TQM response in the US



## Quality: why?

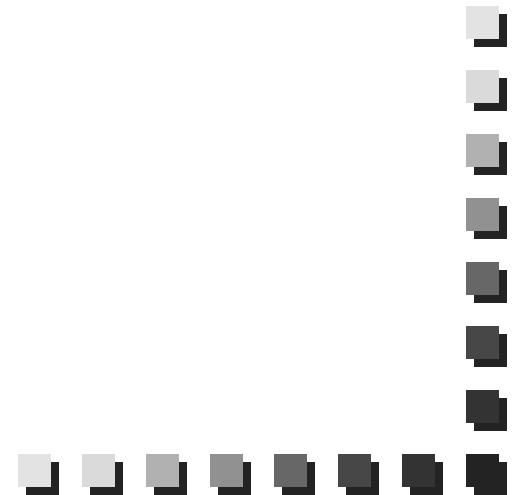
We defined quality as:

- Cost
- Time
- Customer satisfaction
- Defects

Quality = the right combination

Quality = what the customer is likely to buy

Quality = competitiveness in today's market



## Important notes

**Cost of quality:** term that is widely used, and widely misunderstood.

The “cost of quality” is not the price of creating a quality product or service. It is the cost of NOT creating a quality product or service.

- Prevention cost
- Failure cost
- Appraisal cost
- Internal failure cost
- External failure cost

**Top-down approach:** It is of vital importance to implementation of quality that the momentum comes from upper-management in the company.

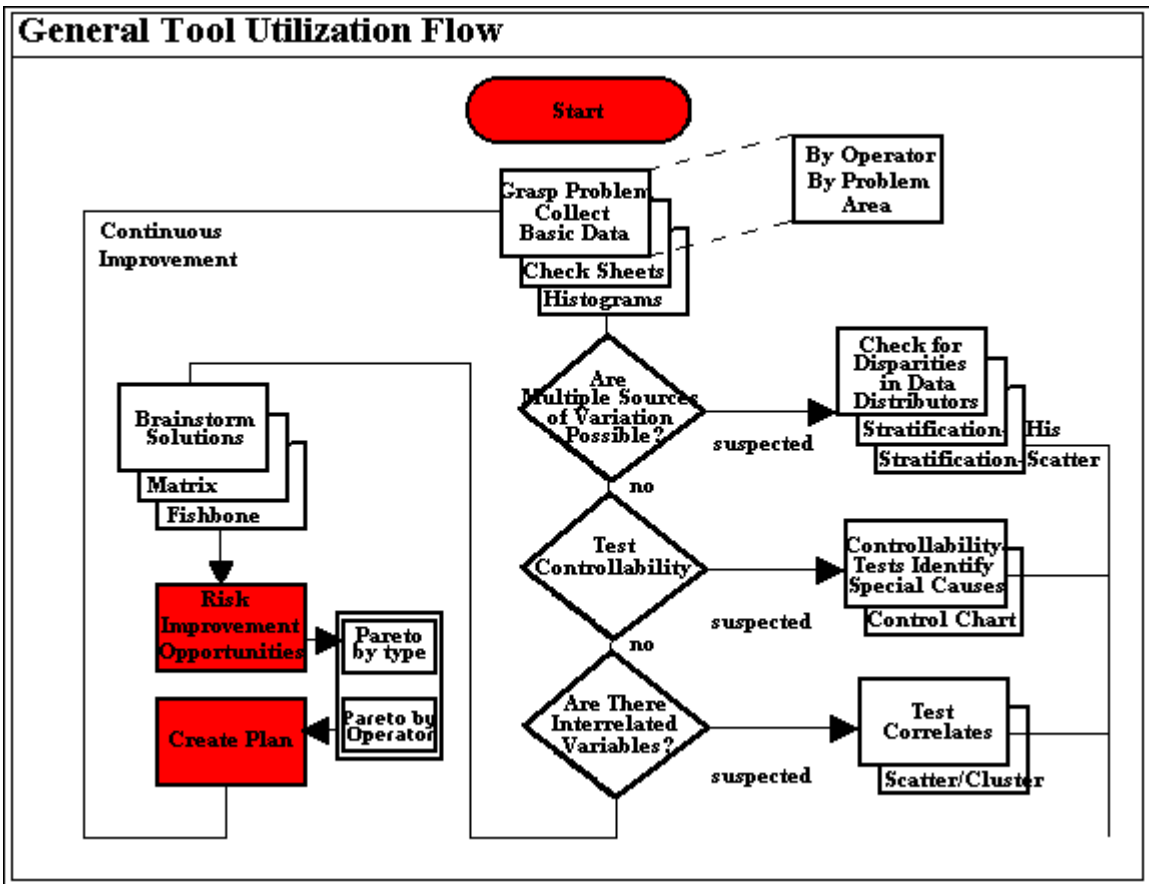


## How it works: Some selected tools

<b>Basic tools</b>		
Flowchart	Control Chart	Scatter Plot
Fishbone Diagram	Histogram	Pareto Diagram
Stratification	Check sheet	Statistical tools
<b>New Tools</b>		
Relations Diagrams	Systematic Diagrams	Matrix-Related Tools
Affinity Diagram	Process Decision Program Chart	Arrow Diagrams



# How it works: applying tools



## Organization-Wide approaches

**ISO-9000:** a set of international standards for quality management and quality assurance. The standards were developed to help companies effectively document the elements they need to maintain an efficient quality system.

**6-sigma:** a fact-based, data-driven philosophy of quality improvement that values defect prevention over defect detection. It drives customer satisfaction and bottom-line results by reducing variation and waste, thereby promoting a competitive advantage.

**Lean:** the elimination of all non-value-adding activities and waste from the business

**Total Quality Management (TQM):** a management approach to long-term success through customer satisfaction. In a TQM effort, all members of an organization participate in improving processes, products, services and the culture in which they work.

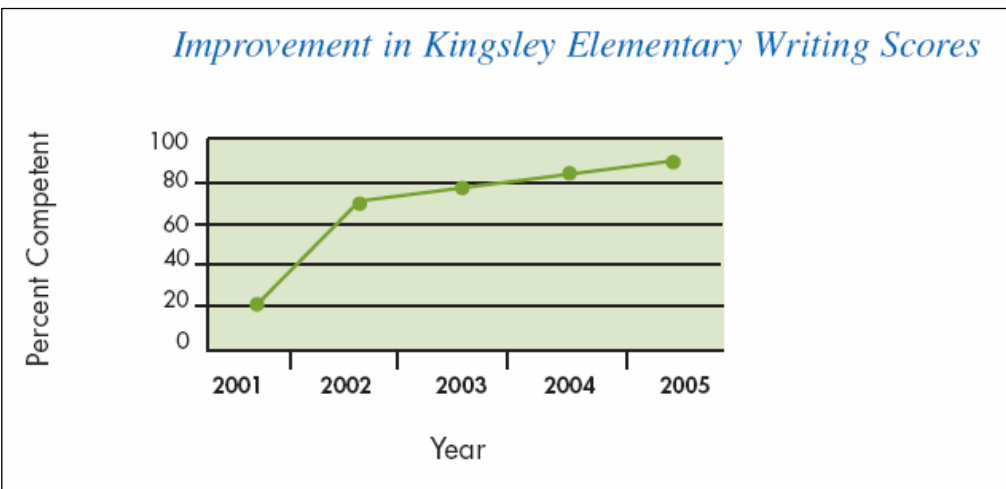


## Examples

Manufacturing companies generally see near-immediate results upon introduction of quality engineering.

Year	Revenue (\$B)	Invested (\$B)	% Revenue Invested	Savings (\$B)	% Revenue Savings
GE					
1996	79.2	0.2	0.3	0.2	0.2
1997	90.8	0.4	0.4	1	1.1
1998	100.5	0.5	0.4	1.3	1.2
1999	111.6	0.6	0.5	2	1.8

Quality can be introduced in many types of organizations.



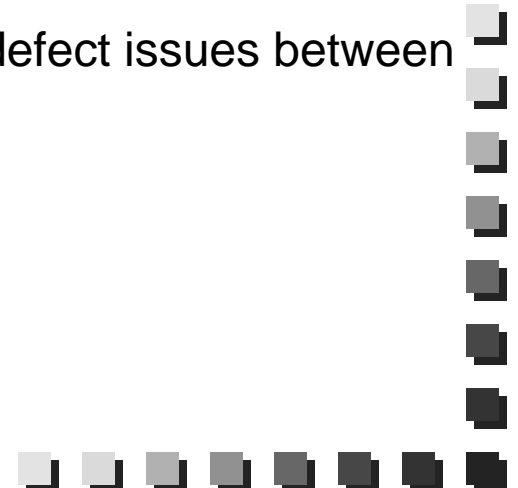
# QRT at the TERL



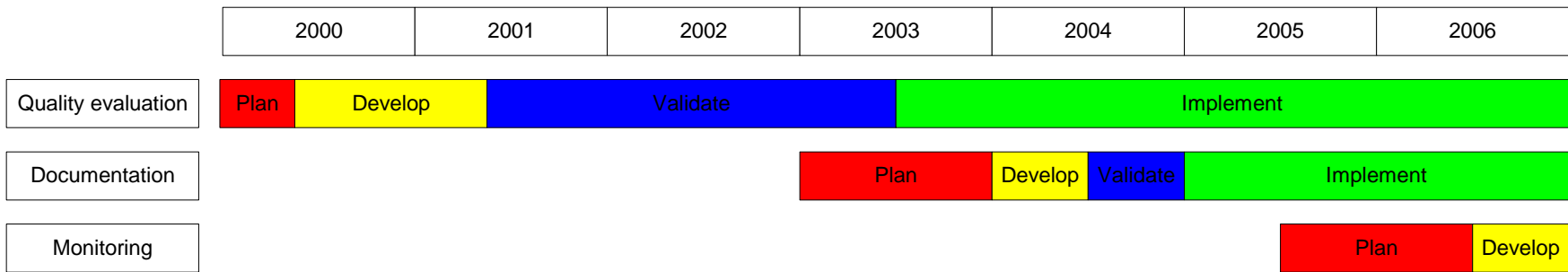
## Problem definition

Primary goals were defined as follows:

- Assess current and potential vendors in terms of their ability to create products of consistent and sustainable quality
- Improve the quality of approved devices used in the field
- Redirect the responsibility of maintaining quality standards to the manufacturers
- Reduce the number of device complaints and defect issues between FDOT and manufacturers

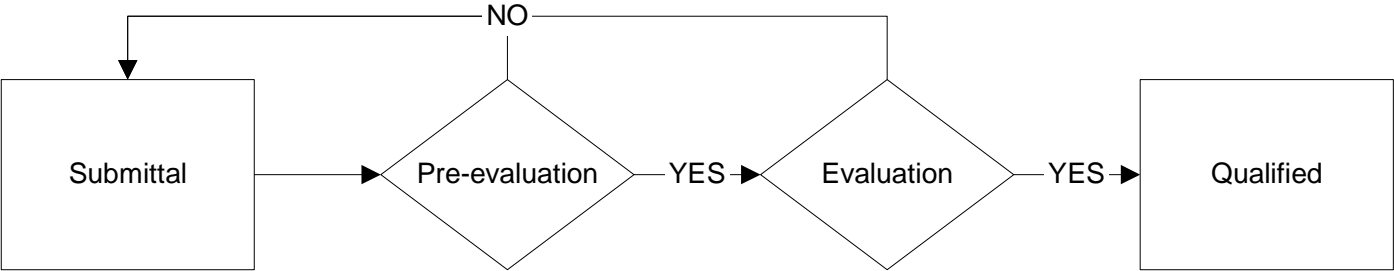


# Work phases



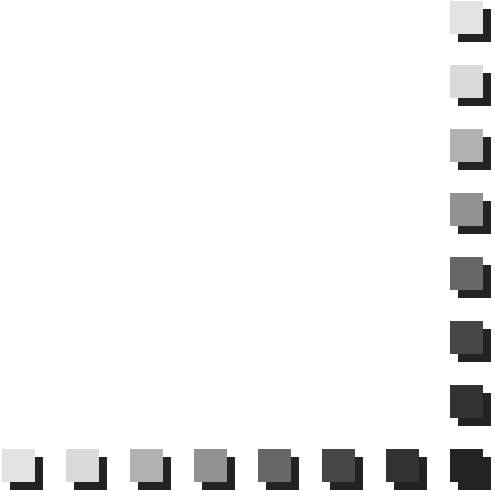
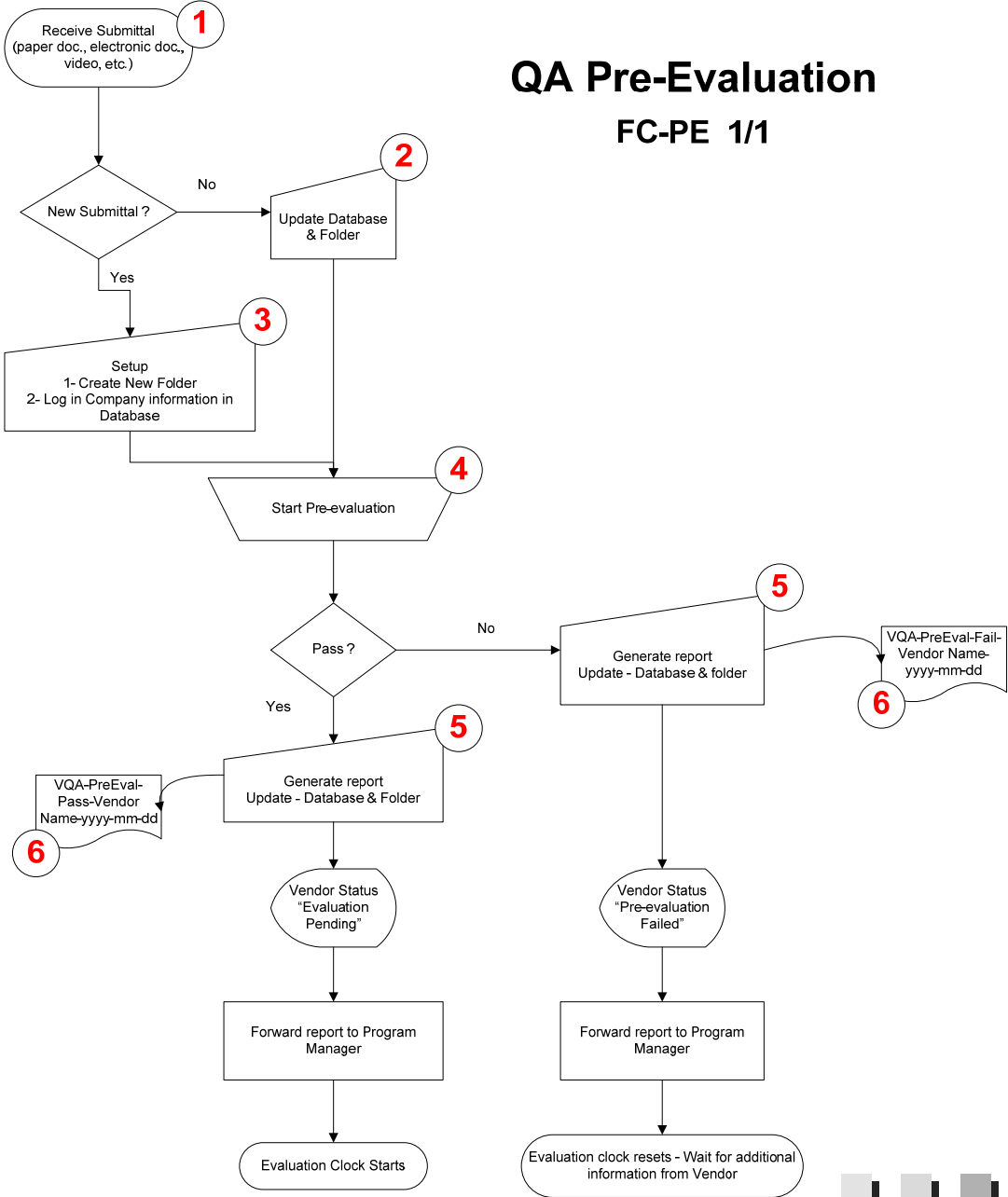
# Quality evaluation process

Simplified view of the evaluation process



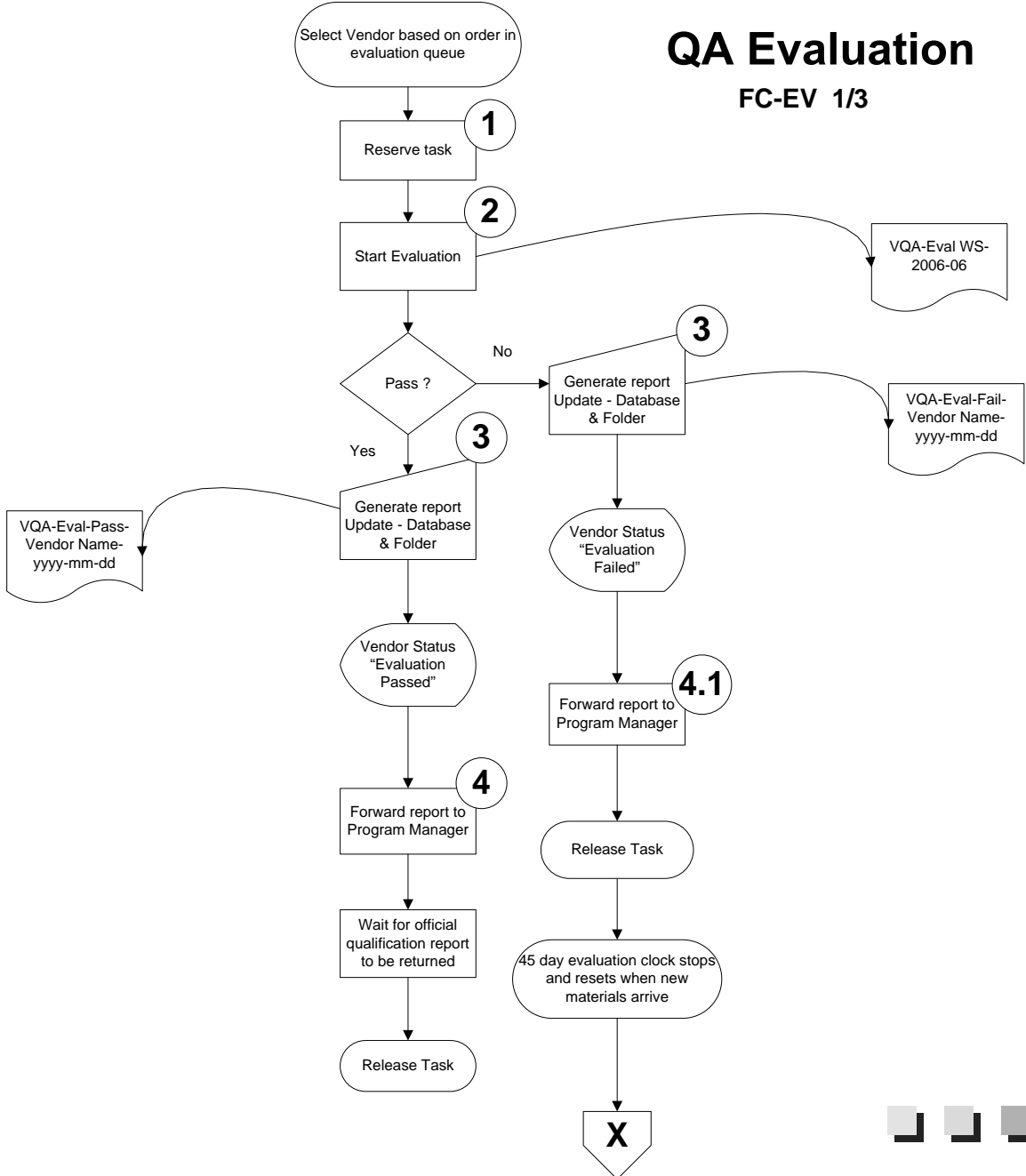
# QA Pre-Evaluation

## FC-PE 1/1



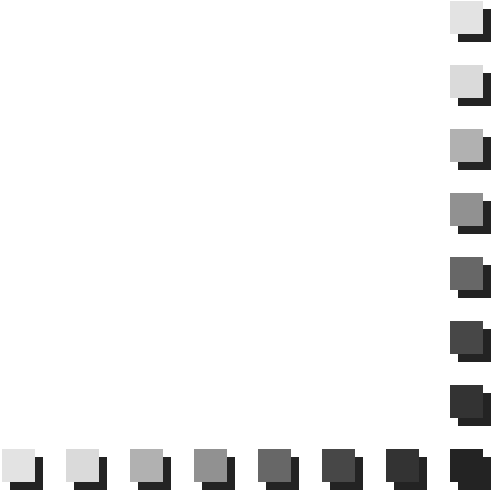
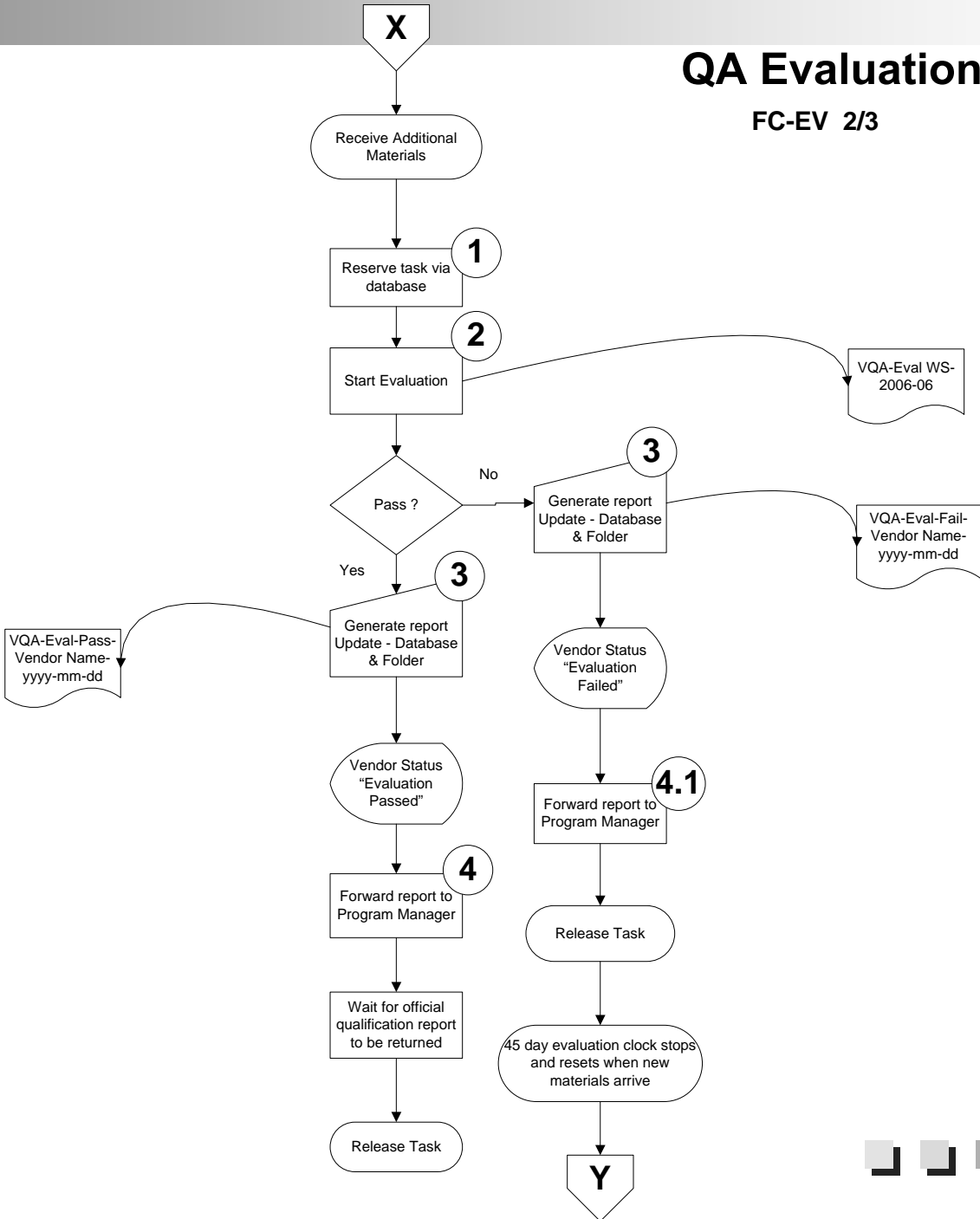
# QA Evaluation

FC-EV 1/3

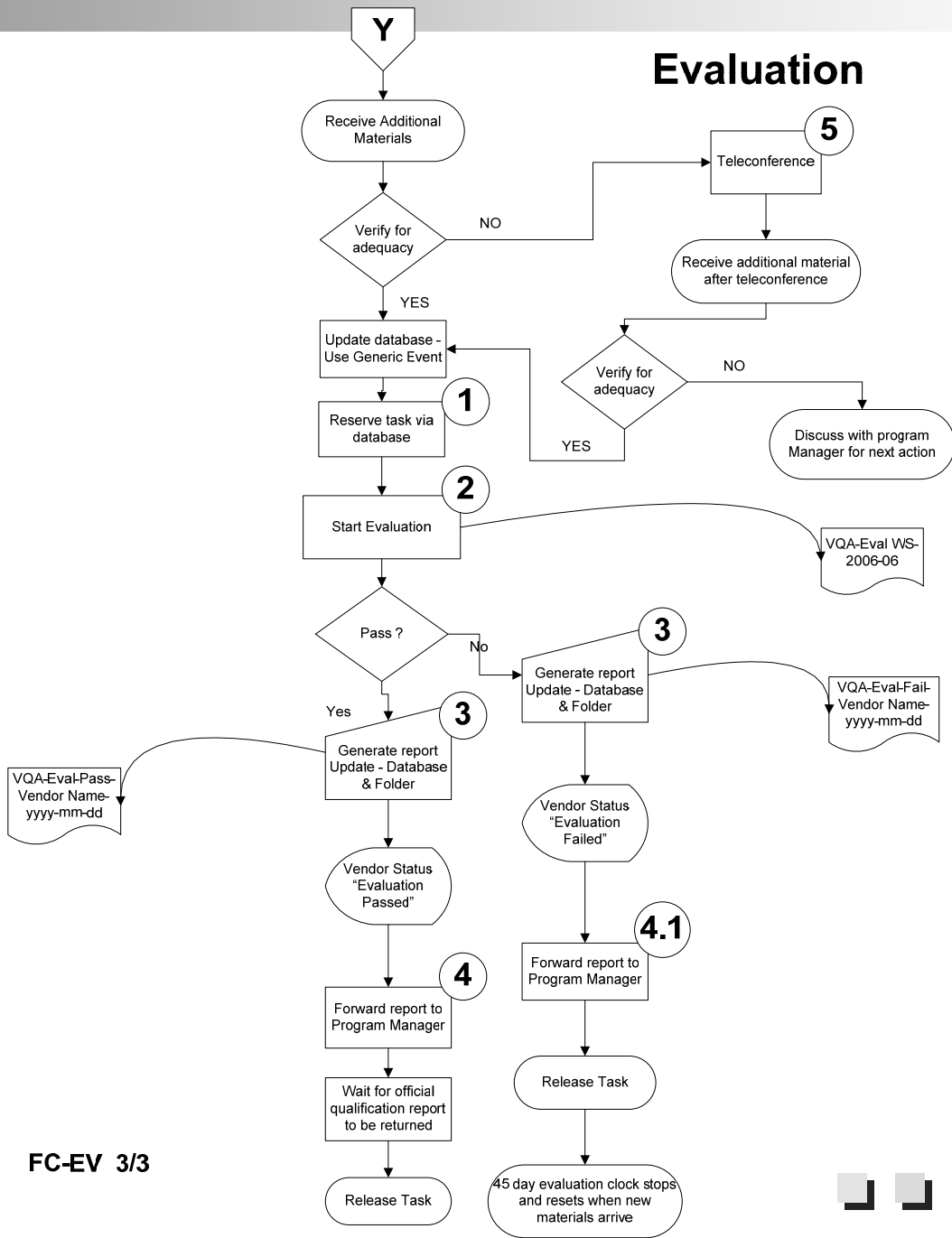


# QA Evaluation

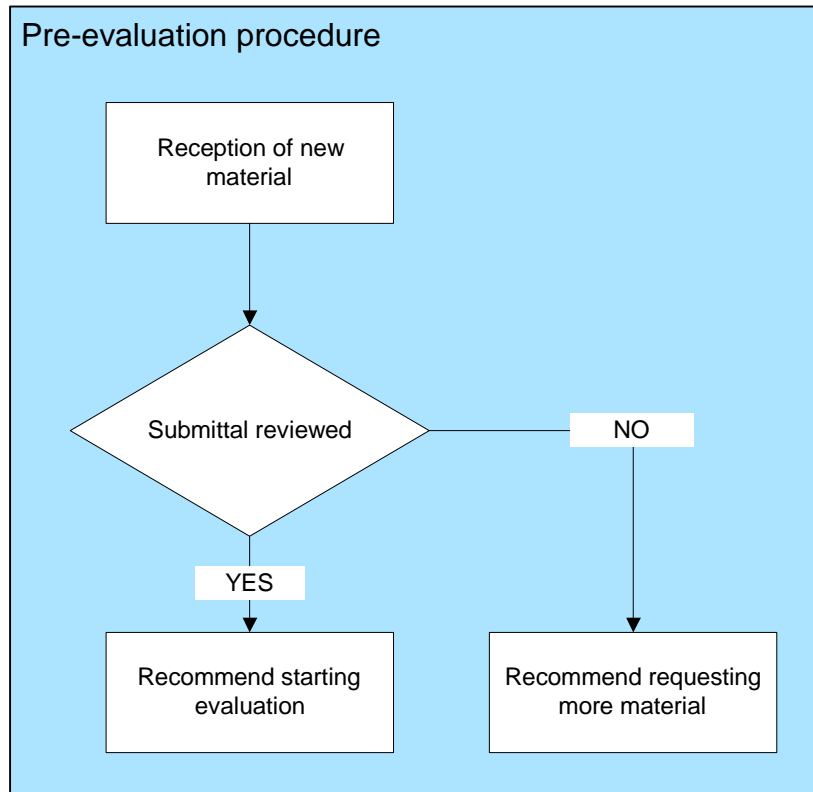
FC-EV 2/3



# Evaluation



## Pre-evaluation and documents



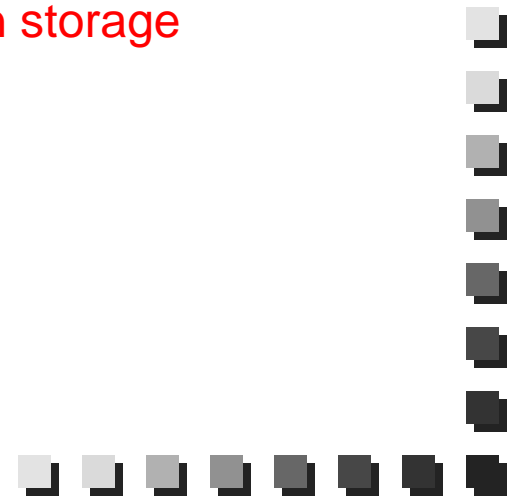
Documents handling

Database handling

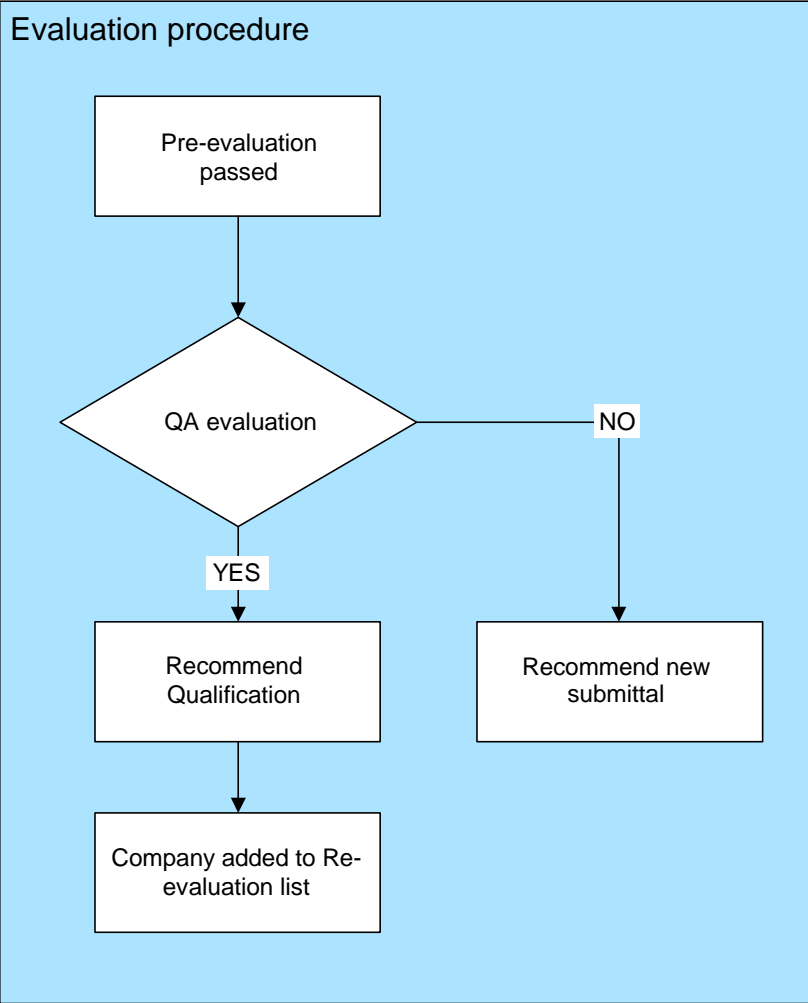
Pre-evaluation help files

Pre-evaluation reports

Information storage



# Evaluation and documents



Documents handling

Database handling

Evaluation reports

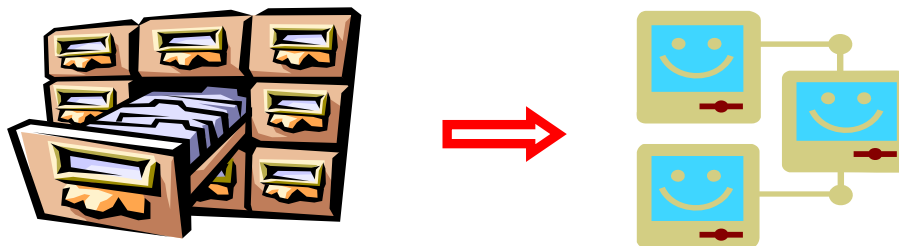
Score sheet

Evaluation help files

Information storage



## Database

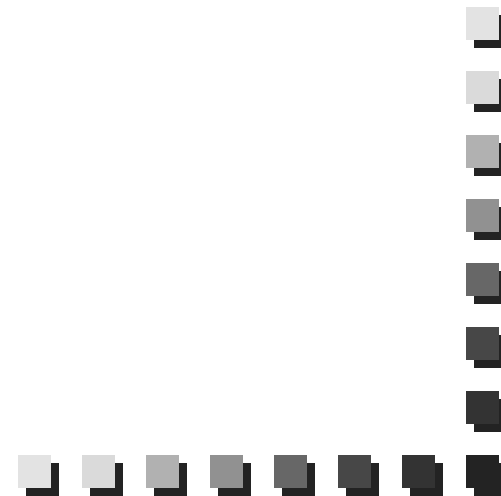


### Initial problems:

- Large amount of working time required to document actions
- Difficult to remember everything
- Learn the QRT “art” of documentation
- Difficult to communicate all the information

### Final solution:

- Secured online database
- PHP server side language
- MYSQL database organization



## Some numbers

### Current status:

- Pending: 1
- Pre-evaluation failed: 21
- Evaluation failed: 14
- QA recommended: 28
- Due for re-evaluation: 34

### Over the last year:

- Submittals: 48
- Pre-evaluations: 25
  - Pre-evaluations passed: 14
  - Pre-evaluations failed: 11
- Evaluations: 30
  - Evaluations passed: 18
  - Evaluations failed: 12



## Feedback

“You are evil”

Almost everyone trying to qualify

“The Quality assurance evaluation [...] has solidified Pelco’s credibility as it pertains to our level of quality”

Daniel A. Vreeland (Pelco)

“[...] you responsibly supply taxpayers with high quality products and your suppliers themselves must continue to meet you level of excellence”

(Traffic Signs, Inc.)

“I believe the state of Florida is setting up the national standard for traffic signal equipment certification [...]”

Michael R. Day (Control Technologies)



# Questions / Comments

