Multilinear Events Sequencing Technology

A brief description of the origins, nature and applications of a research-based INVESTIGATION PROCESS for investigations of all kinds.

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Multilinear Events Sequencing Technology for Investigation

Investigate:

to examine systematically;

to observe or inquire into, usually some phenomenon.

The basic purpose of investigations is to gain understanding of some phenomenon. Sometimes investigations are undertaken simply for the sake of new knowledge. Other time, they are undertaken to be able to predict and control future phenomena. Whatever the reason, all investigations have a common thread: they seek to describe and explain the phenomenon, clearly, validly and consistently.

Investigations are conducted in many ways, ranging from casual single person efforts to elaborate international team investigations. Many investigation methods are used, with varying results.

• What is the Multilinear Events Sequencing-based investigation technology?

The Multilinear Events Sequencing-based investigation technology is an integrated system of concepts and techniques used to investigate a wide range of occurrences, before or after they happen.

The main system elements were developed initially to improve the investigation of accidents, explosions, fire and injuries. It soon became apparent that the investigative system that emerged can help understand, predict and control other phenomena, such as equipment breakdowns, quality problems, and physical trauma. Functionally, it is used in the investigation of risks and development of standard operating procedures, design of facilities safety reviews, hazard analyses, emergency response assessment, and—recently—research.

The multilinear events sequencing-based investigative technology has led to several investigative breakthroughs. One of its most significant breakthroughs is its ability to function as a “research defining” investigation tool. It clearly identifies what one knows and doesn’t know about a phenomenon as one applies these systematic investigation procedures during data acquisition and analysis tasks.

A second breakthrough is the structuring of the problem discovery and definition process. The new technology helps investigators look into a phenomenon systematically and uniformly, to discover problem relationships among system interactions. Understanding these relationships invariably increases the number of choices for controlling the phenomenon, and estimating relative effectiveness of proposed changes.
**Why was the MES technology developed?**

This investigative technology was developed to overcome major defects in traditional investigative processes. A comprehensive investigative methodology was needed to:

- provide a systematized and self-guiding investigation process that was not wholly dependent on the experiences of the investigator.

- Isolate data relevant to the investigation as it is acquired.

- produced consistent, replicable investigation outputs, and provide a process to resolve differences among investigators.

- permitted objective quality control of investigation outputs.

- produced trustworthy, unambiguous descriptions and explanations of accidents.

- provided a systematic procedure to identify and evaluate control options.

- predicted what events should be observed to ensure that future system operations are controlled and functioning as planned.

- facilitating training of investigators in the better methods.

**MES System scope**

The MES investigation system consists of several subsystems. The subsystems include a data observation, transformation and formulation process; data documentation and organization functions; special data display and testing functions; problem search and discovery functions; data relevance testing system; hypothesis development process; planning functions; problem assessment capabilities; recommendation development and assessment elements; deliverable preparation and quality control processes; and emergency response performance assessment procedures.

Additionally the MES system is designed for easy integration of investigation findings into other activities within an organization and across organizations, such as design, procedures development, operations, training, maintenance, public affairs and legal functions, among others.
THE MES INVESTIGATION SYSTEM

Key MES elements

MES investigation technology provides

• A framework for thinking about investigations,

• A structure for capturing and organizing data which defines the system,

• Documentation of system interactions,

• Search methods to discover problems with the interactions and identify candidate control actions, and

• Guidance for monitoring predicted system performance over time.

Other system elements include numerous generic investigation models and investigation or analysis procedures; strategies for future control; a “mental movie” data acquisition guide and testing protocol; events pairing analytic capability; and data sets procedures for identifying common events subsets.

How does MES work?

The MES investigative system is relatively simple in concept and practice. It consists of three phases:

1. development of a description of the system operation or process being investigated, followed by

2. a problem discovery, definition and control phase, followed by

3. the monitoring phase to verify the predicted performance.

1. Description phase.

Phase 1 of the system focuses on describing what happened and why it happened during the accidents or other process, or what can happen and why it can happen in proactive analyses. The output is a description and explanation of the occurrence being investigated. Properly prepared and quality checked, this description can serve all users of accident data. Its contents are tested for validity, completeness and cause-effect relationships with objective procedures. The MES display is the key output generated during the investigation.
2. Problem discovery, definition and control.

After the description is completed, the MES system addresses the discovery, definition and documentation of problems. This is done by examining relationships occurring during the process. Then changes that could be introduced to produce different process outcomes are identified.

Conceptually, the problem definition and control phase is based on examining interactions between specific event pairs in the description for undesired changes, and possible new changes. Candidate control actions at each event pair can be developed, using associated safety principles, strategies and techniques. Each option’s effects on the process can be considered and the reduction in risk estimated by tracking the new changes on the worksheets to the anticipated new outcomes.

3. MES performance improvement plan.

The MES worksheets, with the controls in place, are then used as a baseline to guide observations of the ongoing process to see how it compares with the predicted operation. This forms the feedback loop.

This is a big MES payoff !!

MES outputs guide investigation of anomalies or deviations from predicted performance, and guide the assessment of any changes to the process that are proposed or observed. MES work products provide a useful method to implement a change control system by providing the basis for documenting, analyzing, predicting and monitoring effects of changes before they are introduced into a system or process. AND it facilitates the integration of investigation findings with other functions in organizations, since it focuses on people and object behaviors.

The bottom line.
It sounds complicated, but in practice MES provides simple objective procedures that are easily understood and used. It helps users avoid the differences in opinions and controversy that so often result from ambiguities, abstractions, or value judgments like inadequate or improper performance, causal factors, root causes, fault, or blame.

And now:
Software to implement MES technology. Contact Starline Software Ltd. for details at messoftware@starlinesw.com

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