

Information-Measuring Systems Introduction: Engineering Education Information Support



Speaker's

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Relevance

The introduction of automated tools leads to an increase in the number of large-scale accidents.

The damage is commensurate with the annual growth of gross domestic product and **in 70% of cases is associated with the actions of personnel**

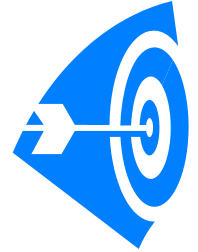


Problem

First, **the insufficient proficiency level of the staff and their low qualification is the cause of economic losses in 70% of emergency situations**

Second, when introducing diverse types of AIMS at enterprises, **they make mistakes the same type.** They are connected with the peculiarities of introducing AIMS regardless of their types.

Goal



The purpose of the study is **to develop engineering education software applied for introducing information measuring systems according to the criterion of minimizing risks** in a professional occupation.

Tasks



1. **Invariant models** have been developed to design and evaluate the effectiveness of the system for the safe AIMS introduction.
2. **Competency models** to generate individual development paths when working with AIMS are developed

Tasks



3. The methods of standard solutions to develop a training system for working with various types of AIMS are developed

4. Scientific provisions and research development in management and decision-making practice are introduced

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The most common used AIMS in Russia is the hardware components set (HCS) called *Energy* to solve the problems of energy production and consumption in industry.

For models were taken into account:

the representatives' competencies and interests of the leading repairing and operational personnel

the experience of implementing various AIMS at enterprises in Chelyabinsk and Sverdlovsk region

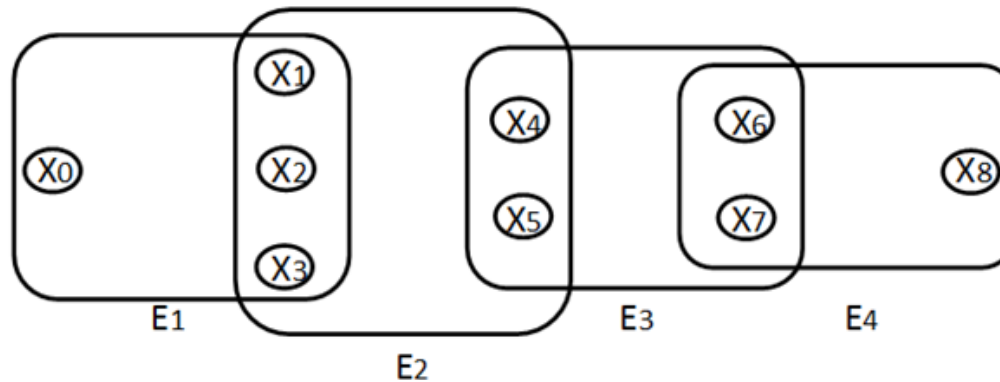
1. INVARIANT MODELS FOR DEVELOPMENT AND EVALUATION OF THE SYSTEM EFFICIENCY OF AIMS SAFE INTRODUCTION

4 organizational structures and 2 automation communications (Table 2) were identified for measuring channels using *Energy* HCS for servicing *Energy* hardware components set (HCS) at the enterprises of Chelyabinsk Region.

The methodology for assessing the impact degree on the security of various threat components is based on the determination of weighting coefficients for each event.

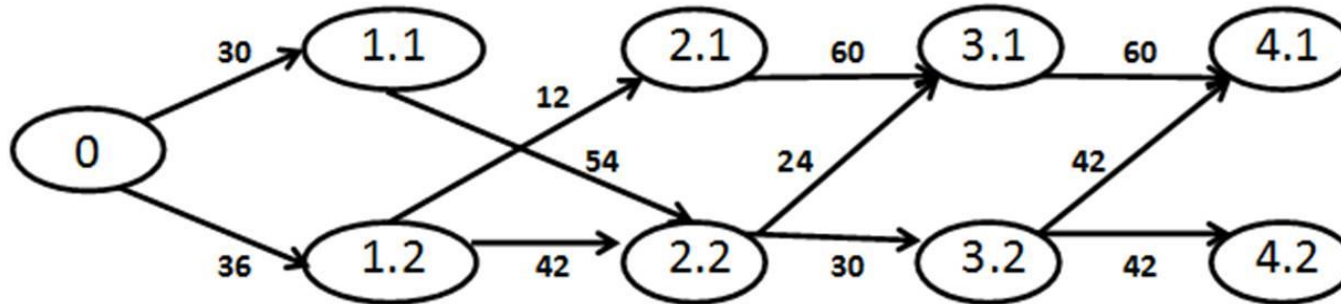
THE METHOD WAS APPLIED at Chelyabinsk Combined Heat and Power Systems (Chelyabinsk CHP-2)

2. NETWORK PLANNING OF INDIVIDUAL DEVELOPMENT PATHS BASED ON COMPETENCE MODELS



i - level professionals correspond to the tops of graph X_i .
 Here, each arc denotes the level of education from secondary school (E1) to postgraduate education (E4).

2. NETWORK PLANNING OF INDIVIDUAL DEVELOPMENT PATHS BASED ON COMPETENCE MODELS



THE RESULTS OF THE IMPLEMENTATION STUDIES

- ✓ Chelyabinsk tube-rolling mill,
- ✓ Chelyabinsk CHP-2,
- ✓ the Amur shipbuilding yard,
- ✓ the Amur metal.

Chelyabinsk CHP-2

The algorithm for constructing a system for the safe implementation

1. **engaging a group of experts**
2. **planning based on models**
 - risk level of 3 at first,
 - 2-level risk.
3. **The final action plan took into account the relationship of the work.**

Results

1. As a result of the applied models, the security of implementation has increased and costs reduced **by 35%** in comparison with the traditional option
2. The difference between an ineffective and effective version of single path dependency **is more than 10%**. implementation process

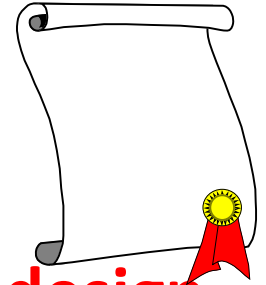


Application

The application of the study results **at Chelyabinsk pipe rolling plant, Chelyabinsk CHP-2, the Amur shipbuilding plant and the Amur metal plant** led to cost savings promoting the safe operation of information measuring systems for accounting for electrical energy and utility products

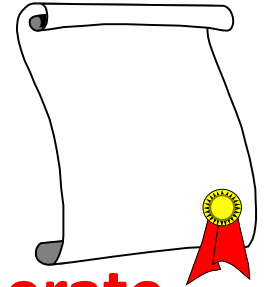


Novelty



1. The authors developed **invariant models to design and evaluate the effectiveness** of safe adopting automated information measuring system (AIMS). The use of these models allows one **to minimize economic losses** caused by incomplete **competencies and consideration for all other participants in the roll-out process**

Novelty



2. Competency models have developed to generate special path dependency when operating with AIMS. As a result of network planning, models allow minimizing economic losses connected with a lack of awareness about educational background, certificates and work experience

Thank you for attention!

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