



HUMAN-COMPUTER INTERACTION

Lecturer

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Human mistakes

1. 42% abnormal situations in industrial systems

<https://wonderwarepaocwest.com/news/operatr-five-contributing-factors-human-error/>

2. Accidents of 45% for nuclear plants, 60% - aviation crashes, 80% - sea disasters and 90% - car accidents

Muratov O., Tihonov M. The human factor at nuclear object, 2008
<http://www.proatom.ru/modules.php?name=News&file=print&sid=1555>

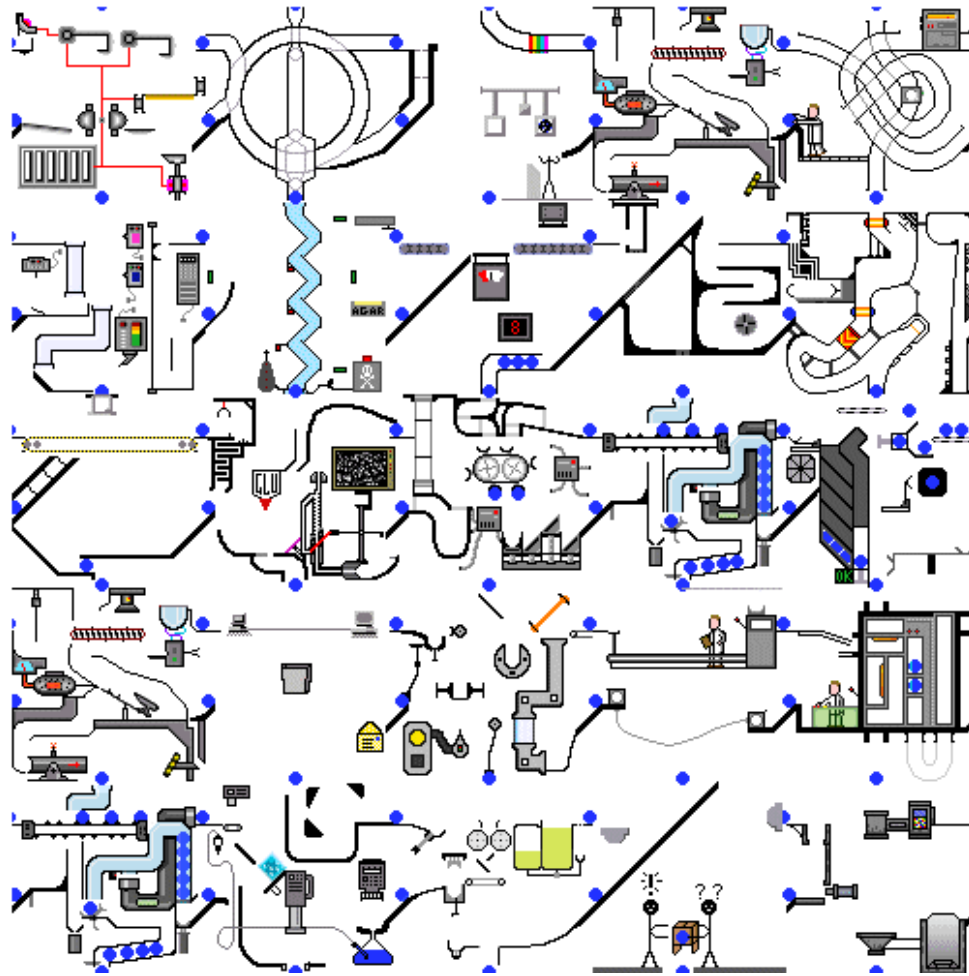
3. Abnormal situations cost the petrochemical industry \$10B (US) annually in preventable losses

Cochran, E., and Bullemer, P. Abnormal Conditions Management: Not by New Technology Alone, Proceeding of the AIChE Safety Conference, Houston, TX, 1996

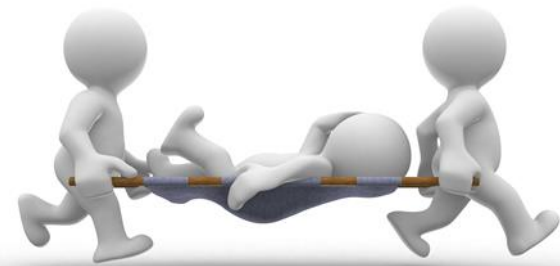
4. 80 to 85% of human errors in chemical production result from poor design of the working environment

Lorenzo, D.K. A manager's guide to reducing human errors: Improving human performance in the chemical industry. Arlington, VA: Chemical Manufacturer's Association. 1990

Operator's brain damage



www.snymans.comtransfer-processsimple-transfe



COURSE DESCRIPTION

Course name: Human-computer interaction

Module name: GUI development

Study cycle: bachelor

Semester: 3

Duration: 12 weeks

Lectures: 24

Lab works: 24

Consultations: 22



AUTHOR'S COURSE MATERIAL

С.М. СЕРДЮК



ЕРГОНОМІЧНІ

ПИТАННЯ ПРОЕКТУВАННЯ ЛЮДИНО- МАШИННИХ СИСТЕМ

ЛЮДИНО-МАШИННА ВЗАЄМОДІЯ



Tempus

Курс лекцій



К.т.н., доцент Сердюк С.М.



2015

AUTHOR'S COURSE MATERIAL

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
Запорізький національний технічний університет



МЕТОДИЧНІ ВКАЗІВКИ

до лабораторних робіт
з дисципліни

“Людино-машинна взаємодія”
для студентів

спеціальності 7.05010301

“Програмне забезпечення систем ”
та 7.05010302 “Інженерія програмного забезпечення ”

денної форми навчання

2015

http://moodle.zntu.edu.ua/pluginfile.php/607/mod_resource/content/1/Лекции_ЛМВ_УКР_2015.pdf

http://moodle.zntu.edu.ua/pluginfile.php/606/mod_resource/content/1/HMI_LAB_15.pdf



Aims of the course competences

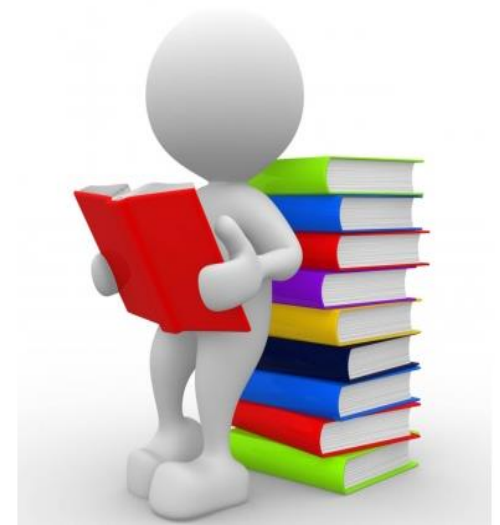
- Training for MMS psycho-engineering and ergonomic design methods
- Training for Ecological Interface (Task-Based Interface) design methods
- Providing capability for Embedded Systems GUI development



Learning outcomes

1. Understanding of ergonomic requirements for each component of the "Man-Machine-Environment" systems, such as:

- Human operator;
- Technical facilities;
- Workplaces;
- Production environment



Learning outcomes

2. Knowledge about operator's activity formalization and modeling methods are applicable to Embedded System
3. Knowledge about System-Ergonomic Analysis of Domain methods
4. Knowledge about Control System HMI design process
5. Knowledge about GUI development
6. Knowledge about usability testing



Lectures structure

Introduction

PART1. MMS ergonomic design

PART2. Control System HMI design

**PART3. Embedded System GUI
development**



Lab works

Lab works №1

Methodical techniques for the System-Ergonomic Analysis of Domain

1.1 Functional analysis

1.2 Allocation of functions between human and machine

1.3 Human task and job analysis



Lab works

Lab works №2

The method of GUI structure, form and layout development

2.1 The goals and operations of interface definition

2.2 Visual hierarchy and visual stream of the interface

2.3 Clustering and alignment of interface elements

2.4 Templates for screen layout



Lab works

Lab works №3

The choice of GUI controls

- 3.1 Basic principles of human-machine interaction
- 3.2 Assortment of GUI controls elements
- 3.3 Recommendations for choosing a GUI controls
- 3.4 GUI coding



Lab works

Lab works №4

Informative graphics. Interface design processing

- 4.1 The models of informational layout
- 4.2 Elements of visualization
- 4.3 Data sorting, searching and filtering
- 4.4 The methods of data concretization



Diploma project

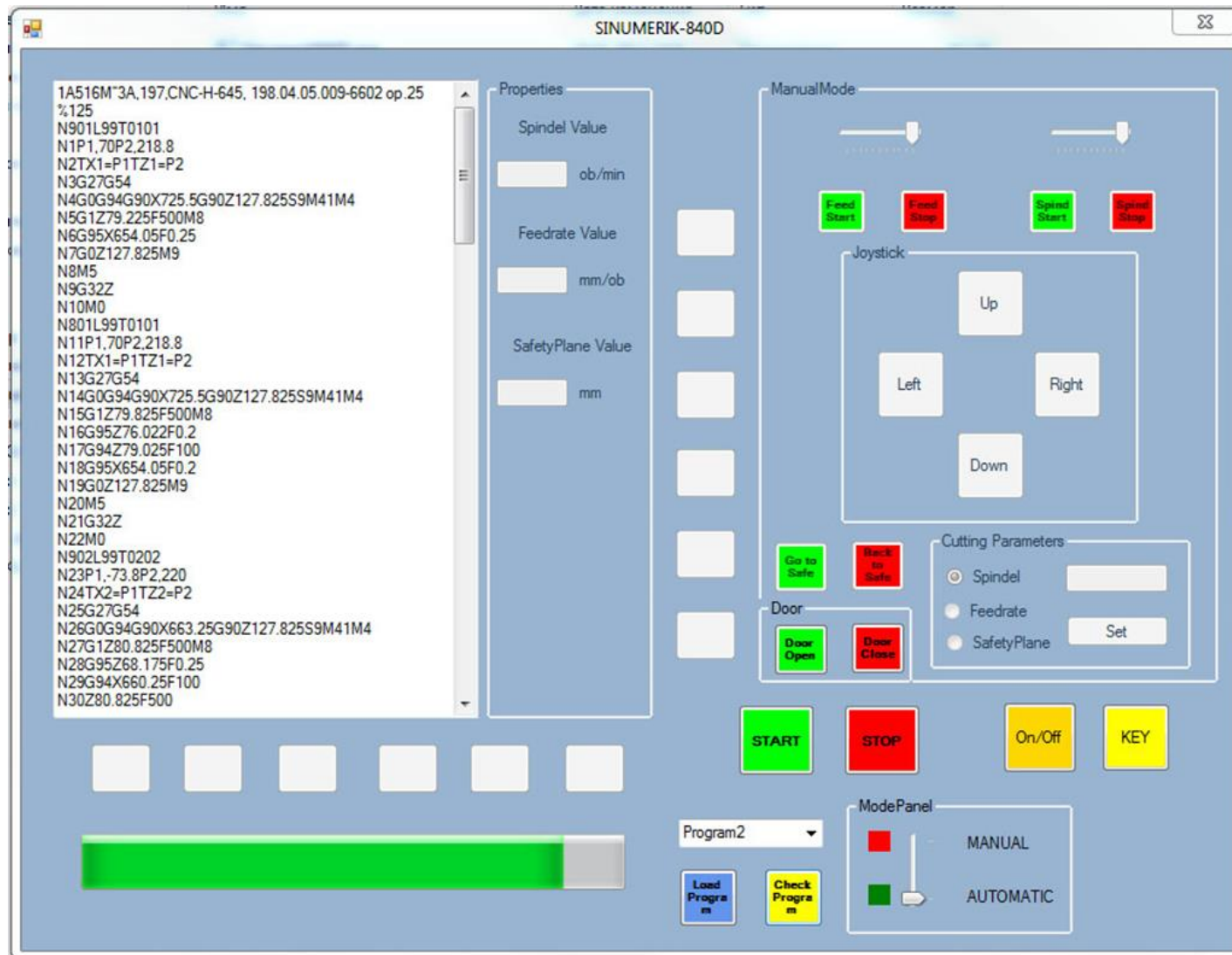
CNC machine Sinumerik 840D HMI development

student KNT-410
Snigko Roman

2014



Main windows



Serviceman's HMI

PANEL OF MANAGEMENT FOR FIELD ENGINEER

Information panel of the condition tool

- Current [ON]
- Drive current [ON]
- Spindle START [ON]
- Grip [ON]
- Lock [ON]
- OK [FALSE]

Main panel of the installation mode tool 2

Adjust/Production Mode

Velocity axes m/min
Ranges from 0,0 before 2,0 with a step 0,2

SPA degrees
Ranges from 0 before 360 with a step 40

Main panel of the installation mode tool 1

Шпиндель 1
Choice of the spindle (from 1 before 3)

Spindle STOP [OFF] Drive rotary [OFF] RESET prog [OFF] Motion STOP [OFF]

Choice prog [OFF] START prog [OFF] Check point [OFF] RAPID [OFF]

Grip Product [OFF]

17:48:24

Contact

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