MATLAB EXPO 2016
MATLAB OBJECT ORIENTED PROGRAMMING FOR ENGINEERING AND DEVELOPMENT ACTIVITIES

10.5.2016
MARTIN GIMPEL
THE COMPANY

AREAS

TOOLS AND TOOLING SYSTEMS
for metal cutting and components in cemented carbide and other hard materials

EQUIPMENT AND TOOLS MINING & CONSTRUCTION

PRODUCTS IN ADVANCED STAINLESS STEELS, SPECIAL ALLOYS, TITANIUM and metallic and ceramic resistance materials
MECHANICAL CUTTING ZELTWEG, AUSTRIA

PRODUCT OVERVIEW

Applications in underground mining and construction:
OBJECT ORIENTED PROGRAMMING IN MATLAB

• Bring data and algorithms together
• Powerful once mastered

Applications:
• …
• Encapsulation of Matlab graphics objects
• GUIs
• Make external interfaces drivers, dlls etc. „usable“
• Data evaluation

classdef MyClass < handle
  %MYCLASS Class syntax demo
  properties
    prop1@double %fixed data type
    prop2@char
    prop3 %undefined
  end
  properties (SetObservable=true)
    data
  end
  events
    SomethingToDo
  end
  methods
    function obj=Myclass
      %Constructor
      obj.prop2='Hi';
    end
    function dosomething(obj)
      notify(obj,SomethingToDo)
    end
    function set.data(obj,value)
      obj.data=value;
      if value>5
        %do somethingdifferent
      end
    end
  end
end
PARAMETER AND LANGUAGE MANAGEMENT

PARAMETER + PARAMETERCOLLECTION CLASSES

• Manage parameter values, defaults, minimum, maximum, display unit, display formatting, enumerations datatypes…

• Referenced by client classes

• Current value retrieval in code by key string:

  value=obj.P.retr('Sump.targetstroke')

RETRIEVE LANGUAGE STRING

• Manage language text and formatting for multi language environment applications

• Languagechange (events)

• Text retrieval:

  obj.L.retr('machineposition');
ENCAPSULATION OF MATLAB GRAPHICS OBJECTS

- Add functionality to basic graphics objects
- Graphics object reference is a property of encapsulating object
- Publish graphics object properties
- Add custom context menus and functionality
• Matlab graphics objects in additional overlay axes
• References to parent, neighbor and child objects
• Multi input navigation
• Callbacks stored as function handle properties
• Multilanguage
DATA ACQUISITION AND REALTIME PLOTTING
OFFLINE DATA ANALYSIS TOOL
HIGHLOAD ROCK CUTTING TEST RIG
DESIGN CONCEPT

MULTIPURPOSE CONCEPT

- Disc cutting: conventional or undercutting
- Pick cutting: single tool / multiple tools, radial tool / conical tool
- Horizontal raise boring
- Horizontal drilling

Cutting unit
Drive tool unit
Control room
Concrete foundation
HIGHLOAD ROCK CUTTING TEST RIG
MODULAR CUTTERHEAD CONCEPT

radial pick

tri-cone-bit

17" disc

13" disc

raise boring cutter

conical pick

water

compressed air

power supply, Ethernet via fibre optic

oil
HIGH LOAD ROCK CUTTING TEST RIG
MEASUREMENT SYSTEM

• Software fully implemented in Matlab
• Interface with measurement hardware: binary TCP/IP protocol
• Customization of hardware modules
• Modular and expandable
GUIDANCE SYSTEM

NORTHtoHAIFA 11.917 m
TopHeading

<table>
<thead>
<tr>
<th>Options</th>
<th>Start</th>
<th>Logging</th>
</tr>
</thead>
</table>

for cutterhead arm
THANK YOU FOR YOUR ATTENTION