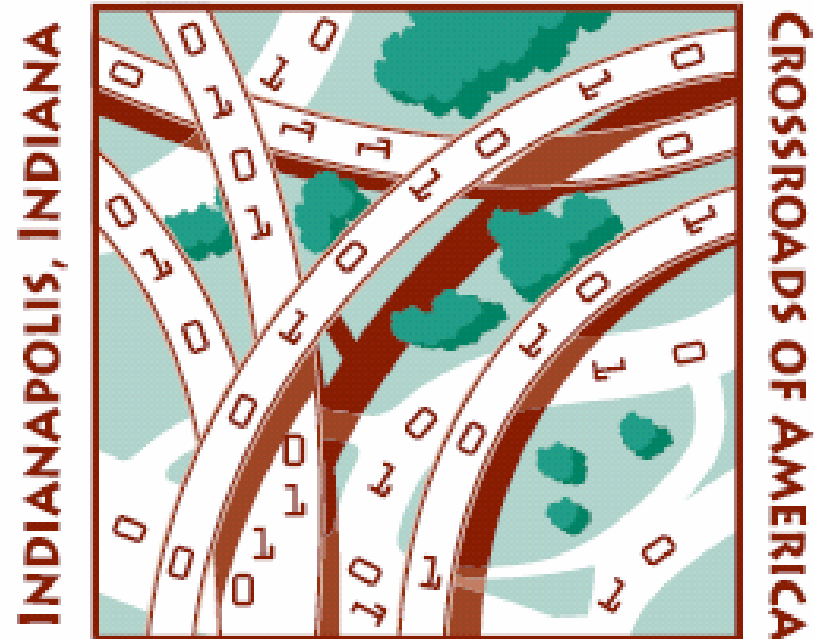


# MWSUG 2008



**OCTOBER 12-14**

## P Charts for Improved Analysis

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# P Charts for Reporting and Improved Analysis

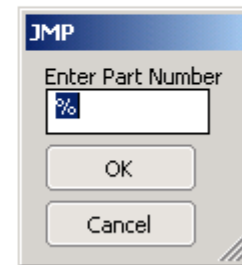
- **Purpose: Provide support engineers with data analysis and data exploratory tools for -**
  - **Improved data analysis**
  - **Reduced reporting time**
  - **Improved product dispositions**

# JMP User Interface

- Provides improved data analysis capability
  - Simple, fast, improved summaries
  - Little or no training
  - High Return on Investment

```
// Re do for general weekly reporting
// Removed Part Number clause for P charts
// Rev 4 Added prompt for Product Line Data Table
caption( "Wild Card Is %");
r=Dialog(
    "Enter Part Number",
    Part = Edit text( "%" ),
    Button( "OK" ),
    Button( "Cancel" )
);
myvalue =r["part"];
show(myvalue);
caption(remove);
```

Wild Card Is %



# Database Connections for Tests Results and Predictions

```
dt=open database(
"DSN=Naperville Mercury;APP=JMP;WSID=USNVE1VKANEL;DATABASE=Metrics;Trusted_Connection=Yes",
"select * from datasources..Staging where [Part Number] like ' " || myvalue || "' ",
"Staging");

datatable("Staging") << run formulas;
```

	localID	Part Number	Serial Number	Module Revision	Fail	Pass	Tested By: Initials	Date Logg
1	1		UZ2296391	M	0	1	Stage Team	01/31/2007 12:0
2	2		UZ2296413	M	0	1	Stage Team	01/31/2007 12:0
3	3		UZ2296353	M	0	1	Stage Team	01/31/2007 12:0
4	4		UZ2296328	M	0	1	Stage Team	01/31/2007 12:0
5	5		UZ2295767	M	0	1	Stage Team	01/31/2007 12:0
6	6		UZ2295485	M	0	1	Stage Team	01/31/2007 12:0
7	7		UZ2295488	M	0	1	Stage Team	01/31/2007 12:0
8	8		UZ2295494	M	0	1	Stage Team	01/31/2007 12:0

ODBC connection to remote DB

Initial staging data table

```
// Gets prediction table
dt = Open Database(
"DSN=Naperville Mercury;APP=JMP;WSID=USNVE1VKANEL;DATABASE=Mercury;Trusted_Connection=Yes"
"SELECT * FROM dbo.PUB_Part",
"Predictions"
);
```

	Part Number	Part Name	Description
177	0	ADSL 6+6 E-ATM G.LITE	ADSL 6+6 G.LITE E-ATM 600 OHM
178	0	S.HDSL	G.SHDSL ATM UNI 6-PORT CHANNEL
179	0	ADSL 6+0 ANNEX C - 6 PORTS	ADSL 6+0 ANNEX C - 6 PORTS
180	0	L-PAY	LET PAYPHONE CHANNEL UNIT
181	0	R-PAY	RST PAYPHONE CHANNEL UNIT
182	0	ADSL 4+6 Centillium 600Ohm	ADSL 4+6 E-ATM 600 OHM

ODBC connection to Eng DB

Engineering data table



# Improving Data Quality

```
// Fix Part Number here
datatable("Staging Sort") << new column("Part Number Fix",
formula(Uppercase( :Part Number )));
datatable("Staging Sort") << run formulas;
```

Converts all part number characters to upper case

```
// Correct pass fail
datatable("Staging sort") << run formulas;
datatable("Staging Sort") << new column("Stage Pass Fail", character
formula(If( :Fail > 0,
"Fail",
"Pass"
)));
```

Standardizes pass/fail counts

```
// Add Pass Fail Column to correct Pass Fail Counts
datatable("Staging sort") << run formulas;
datatable("Staging Sort") << new column("Pass Fix",
formula(If( :Stage Pass Fail == "Pass",
1,
0
)));
```

# Improving Data Quality

```
// Date section *****  
datatable("Staging Sort") << new column("Month",  
formula(Month( :Date Logged)));  
datatable("Staging Sort") << new column("Year",  
formula(Year( :Date Logged)));  
  
DataTable("Staging Sort") << new column("Date M/Y",  
format("M/Y"), formula(:Date Logged));
```

Adds columns for scrubbed data and date summaries

Pass Fix	Fail Fix	Serial Number Fix	Part Number Fix	Month	Year	Date M/Y
1	0	UN0030006		3	2006	03/2006
1	0	UN0030036		3	2006	03/2006
1	0	UN0030037		3	2006	03/2006
1	0	UN0610003		3	2006	03/2006
1	0	UN0610007		3	2006	03/2006
1	0	UN0610104		3	2006	03/2006
1	0	UV0461194		3	2006	03/2006
1	0	UV0542477		3	2006	03/2006
1	0	UV0542480		3	2006	03/2006
1	0	UV0542499		3	2006	03/2006
1	0	P8P2FKP	131S	3	2006	03/2006

# Manufacturing Identifiers

- Decode the serial number tested and add identifiers for the manufacturer, manufacturing year, week and day

```
// For decoding the serial number into manufacturing date
datatable("Staging Sort") << new column("Serial Number Character",
character, formula(Uppercase( Substr( :Serial Number, 1, 1 ) )));
```

```
datatable("Staging Sort") << new column("Mfg Date",character,
formula(If( :Name( "Mfg Year (SN)" ) == 0,
Char( :Warranty_Date ) || " - " || Char( :Warranty Year ),
Char( :Name( "Mfg Year (SN)" ) ) || " - " ||
Char( :Name( "Mfg Month (SN)" ) )
)));
datatable("Staging Sort") << << run formulas;
```

```
dt<< new column("Year Month", character,
formula(Char( :Year ) || " - " || Char( :Month )));
dt << run formulas;
```

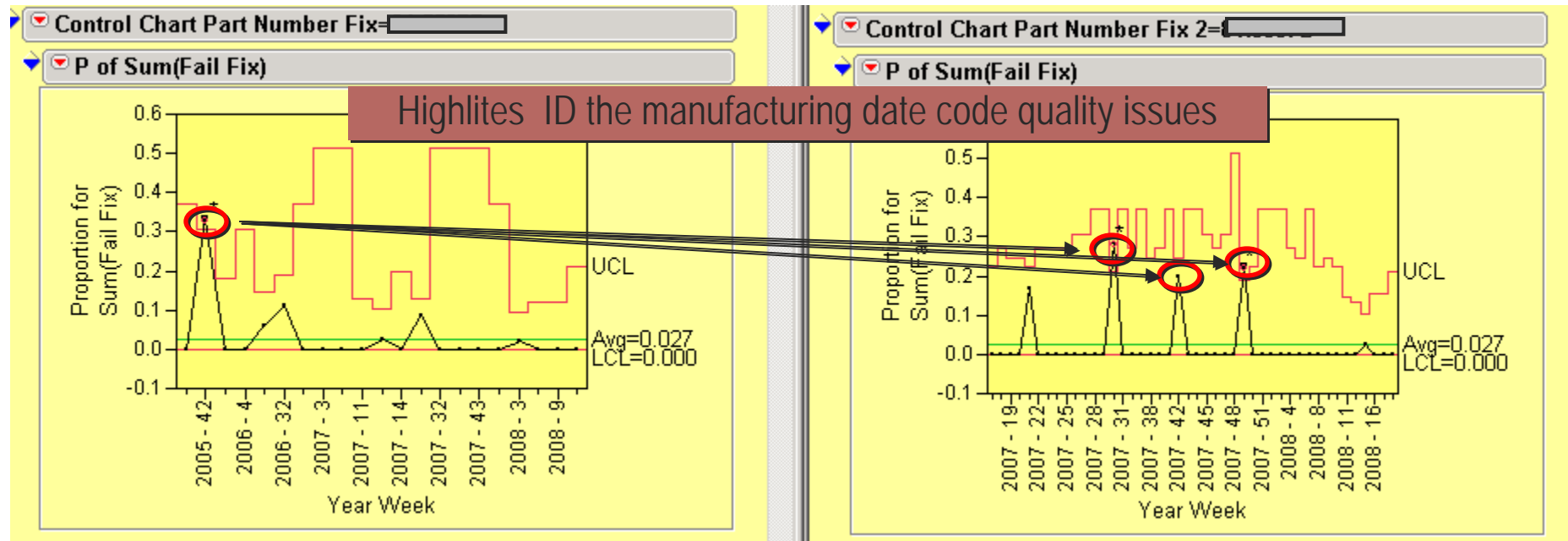
Added columns  
for reporting and  
manufacturing dates

Mfg Date	Month	Year	
2006 - 5	6	2006	
2006 - 5	6	2006	
2006 - 5	6	2006	
2006 - 4	6	2006	
2006 - 4	6	2006	
2006 - 4	6	2006	
2006 - 5	6	2006	
2006 - 5	6	2006	

# Output P Charts Manufacturing Dates vs. Reporting Dates

- P chart for manufacturing year and week

- P chart for calendar year week report





# JMP User Interface to Remote SFDC

Simple interface minimizes training

SPC Analysis Guad Rev 1

```
1
2
3 // Released....June 08
4 // Rev 1 Added Product Line Summary
5 // contact Vin Kane # 630 798 6404
6 //      vincent.kane@tellabs.com
7 // Major revision to delete columns until needed.
8 // Connect to Mercury database where the Guadalajara SFDC is
9 // *****
10
11 // Datatable contains all the pass fail records from Guad Jalisco
12
13 // Dialog box for data entry
14 r=dialog("Enter Part Number", Part=Edit text (""),
15 "Enter Product Line", PL = Edit text (""),
16 "Enter Start Date", StartDate = Edit text ("01/01/2007"),
17 "Enter Stop Date", StopDate = Edit text ("06/01/2008"),
18 Button("OK"), Button("Cancel"));
19
```

JMP

Enter Part Number

Enter Product Line

Enter Start Date  
01/01/2007

Enter Stop Date  
06/01/2008

OK

Cancel

Single part number or Wild Card for Product Line

Start Date  
01/01/2007

# JMP Summary Outputs

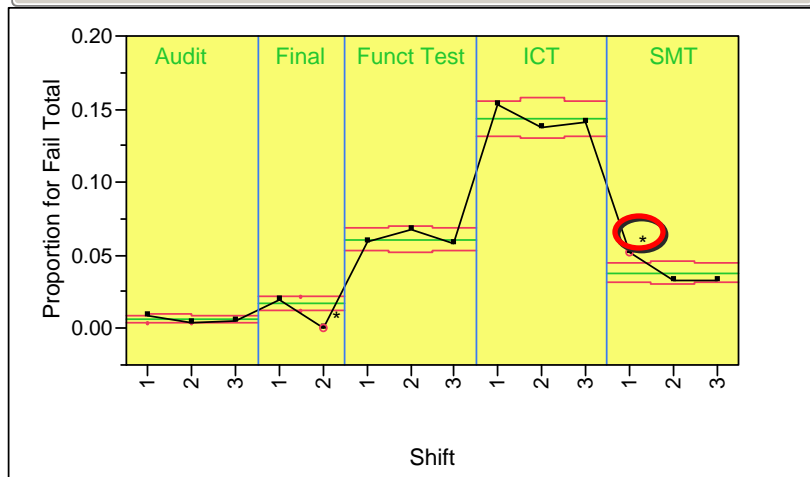
Code generated by jmp copied and pasted within overall script

```

datatable("Shift Totals") << Control Chart(
  Sample Label( :Shift ),
  Phase( :Operation ),
  Sample Size( :Total ),
  KSigma( 3 ),
  Chart Col(
    :Fail Total,
    P( Test 1( 1 ), Test Beyond Limits( 1 ) )
  )
);
    
```

Control Chart

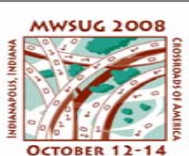
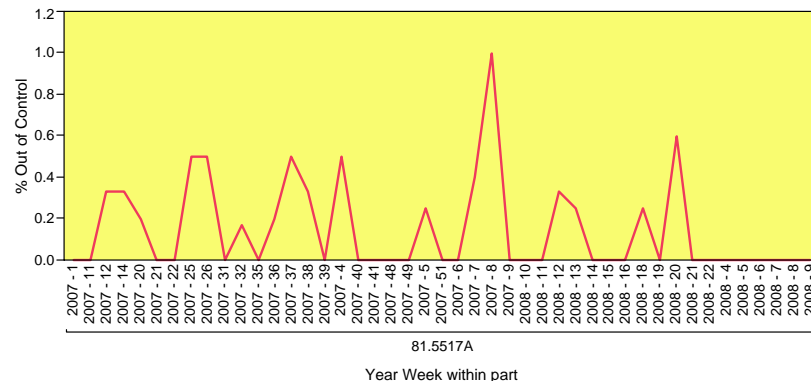
P of Fail Total



Overall failure % by shift by Inspection Test process. Control limits indicate a statistical difference between shifts within Inspection Test Steps

Line Chart with the % of occurrences the process went beyond the 3 sigma control limits

Chart Operation=ICT

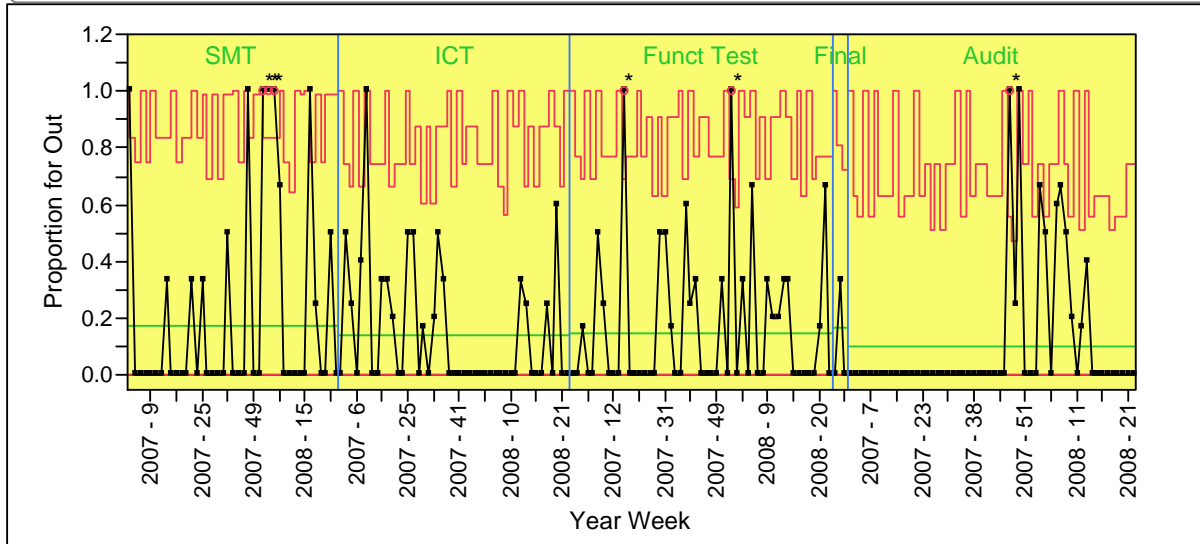


# Summary Outputs Available

## Summary Outputs Available

Control Chart

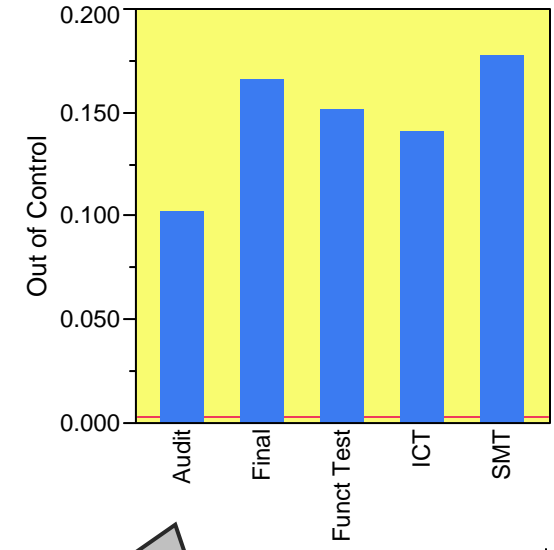
P of Out



7/10/2008 6:41 AM

Data Table=SPC Summ Split

Chart



Plots the % of daily occurrences that product exceeded SPC limits with **Average-----**

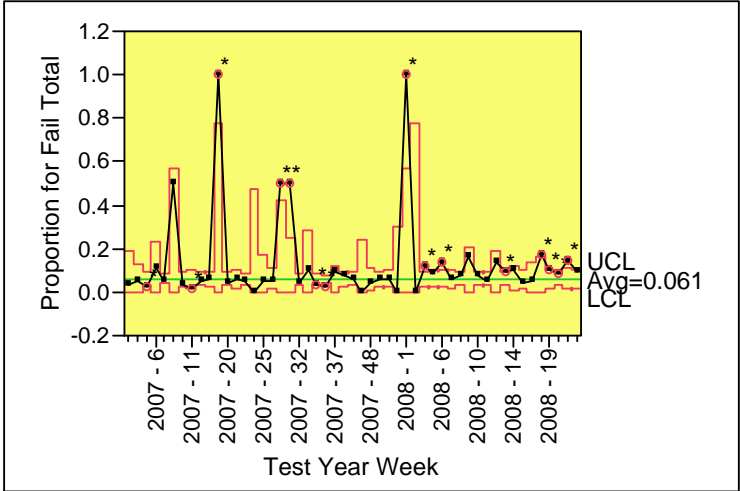
Plots the % of daily occurrences average that product exceeded SPC limits

# Outputs Available, Weekly Summaries

Standard SPC P charts for each Inspection / test Process with points exceeding the control limits identified \*

Control Chart  A, Operation=Funct Test

P of Fail Total



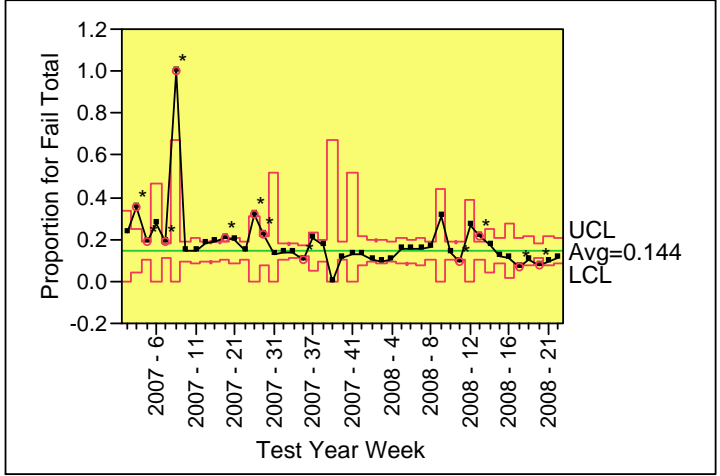
Any data point can be removed and the chart recalculated when root cause corrective action is taken

## P Chart code example

```
new window(myvalue||" Daily P charts ",
Data Table( "Daily Yield Totals" ) <<Control Chart(
Sample Label( :Year Week Day ),
Sample Size( :Total ),
KSigma( 3 ),
Chart Col(
:Fail Total,
P( Test 1( 1 ), Test Beyond Limits( 1 ) )
),
by( :part, :Operation)
));
```

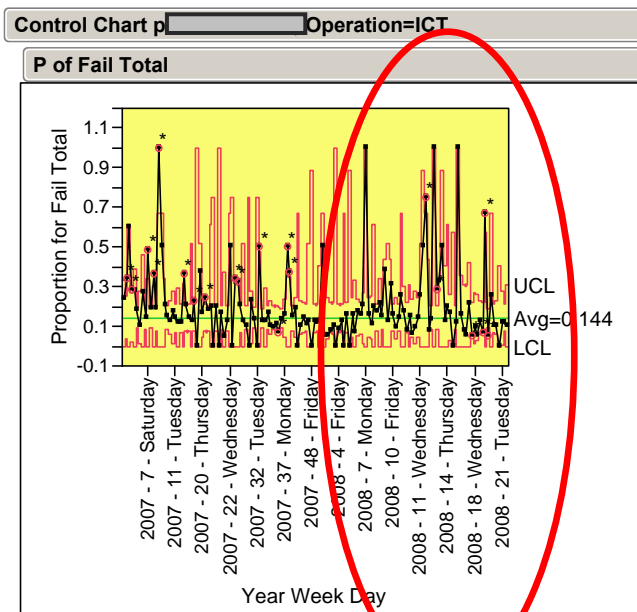
Control Chart part  , Operation=ICT

P of Fail Total



# Outputs Available, Daily Summaries

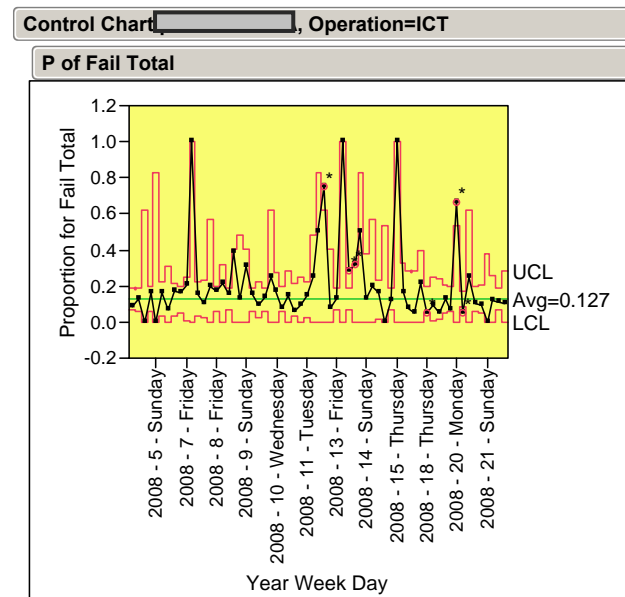
When needed, P Chats can be employed at the daily level



Standard SPC P charts at daily level for each Inspection / test Process with points exceeding the control limits identified

Shorter report window

Data points can be removed and the chart recalculated when root cause corrective action is taken or process change takes place



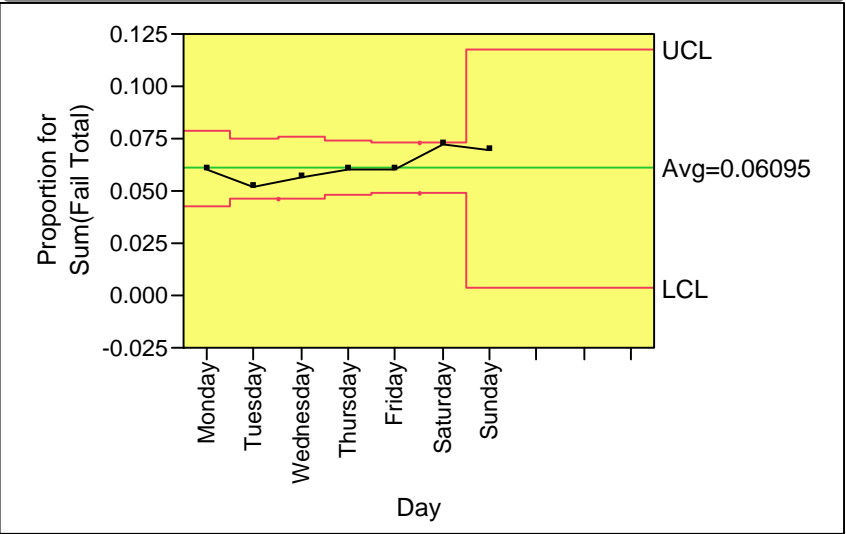
# Non Traditional Summaries Example Day of the Week Analysis

SPC P charts for each Inspection / test Process by test day of the week with code

```
new window(myvalue||" Daily P charts ",
Data Table( "Daily Yield Totals" ) <<Control Chart(
Sample Label( :Year Week Day ),
Sample Size( :Total ),
KSigma( 3 ),
Chart Col(
:Fail Total,
P( Test 1( 1 ), Test Beyond Limits( 1 ) )
),
by( :part, :Operation)
));
```

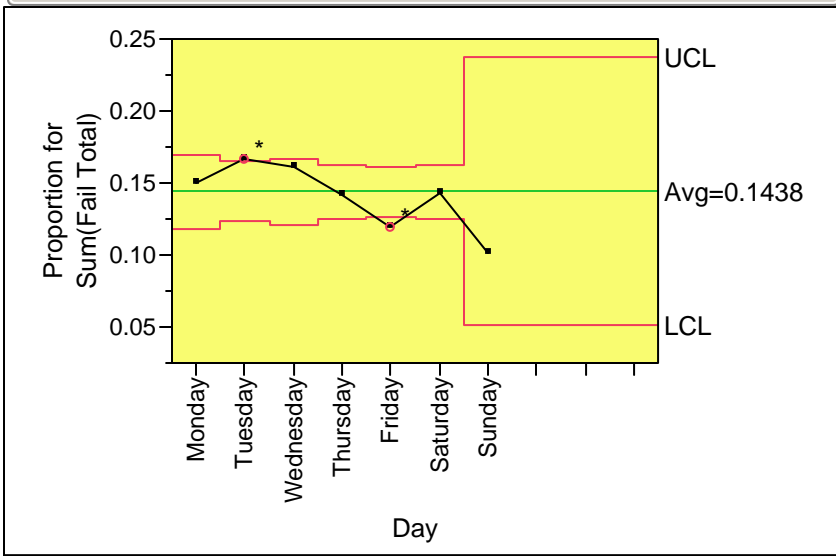
Control Chart part= operation=Func Test

P of Sum(Fail Total)



Control Chart part=81 operation=ICT

P of Sum(Fail Total)



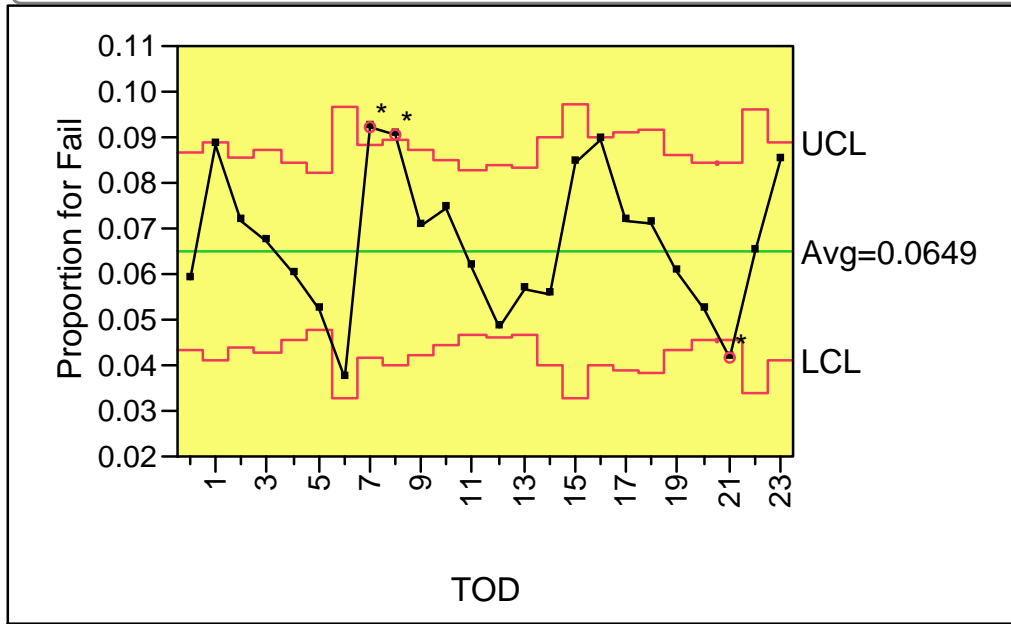
Points outside the control limits indicate a possible assignable cause



# Outputs Available Forest Vs Trees, Ad hoc Analysis

## Control Chart

### P of Fail



SPC Chart for failure rate by the time of day

P Chart code is generated when chart is created

Points outside the control limits indicate a possible assignable cause is present

```
datatable("TOD") << run formulas;  
new window(myvalue),  
datatable("TOD") << Control Chart(  
  Sample Label( :TOD ),  
  Sample Size( :Total ),  
  KSigma( 3 ),  
  Chart Col( :Fail, P( Test 1( 1 ), Test Beyond Limits( 1 ) ) )  
));
```

# Summary

- User dialog box and database connection scripts mean little to no training required for the quality support engineers
- Provides a confirmation of the sub contractors process control
- Improved data analysis capability by utilizing various level of data summaries with P charts to signal the presence of assignable causes, by both manufacturing and reporting calendar
  - By:
    - Product
    - Shift
    - Day
    - Week
    - Month