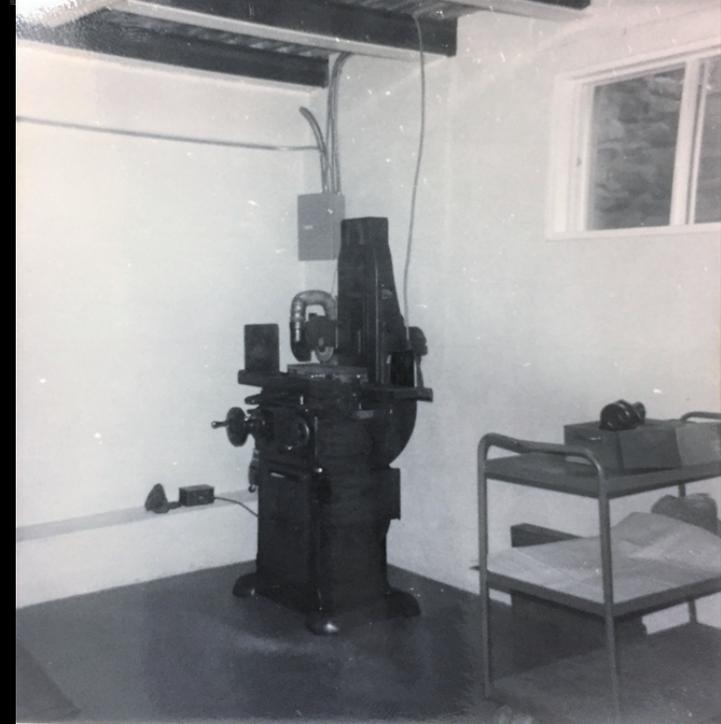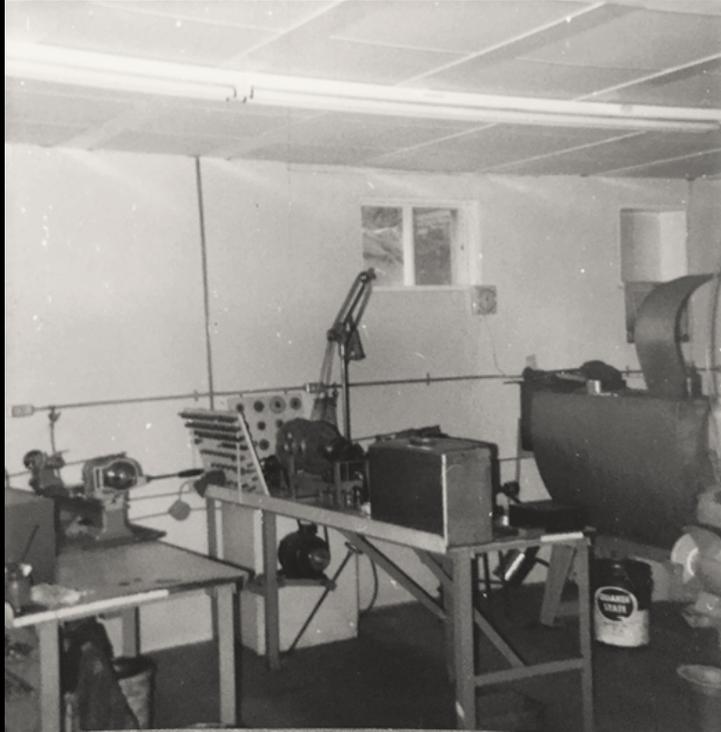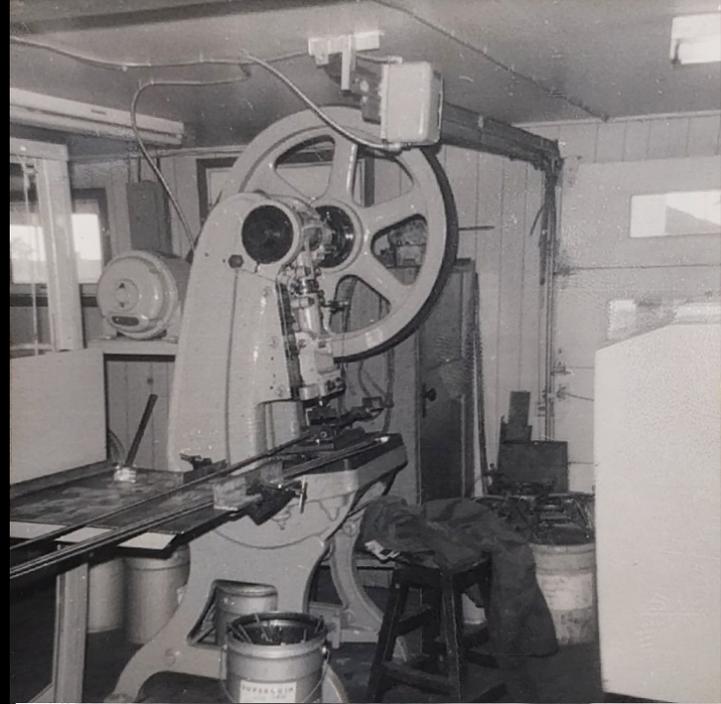# APN
L'expérience APN/La donnée, carburant de l'IA

par Yves Proteau

APN ➡ 4.0

APN ➡️ IA ???

2.0 → 1970

3.0 ➡ 1998

27.01.2006

4.0 ➡ 2004

20. 12. 2004

15.09.2005

ERP: JOBBOSS

CAD: SOLID WORK

QUALITY SYSTEM :   UNIPOINT

Nakamura-Tome

Super *NTJX*
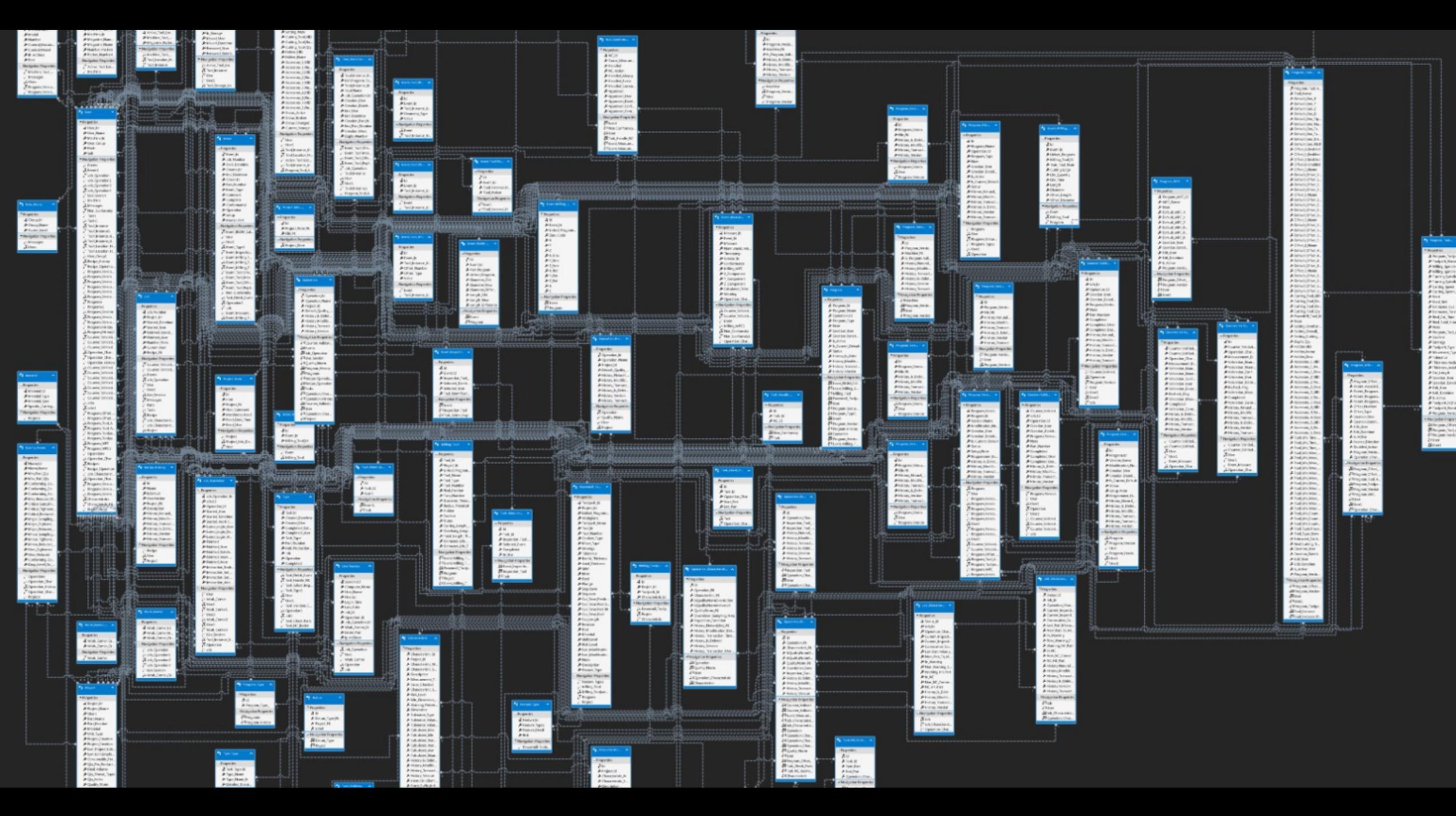
5

FILTREOMAX

Nakamura-Tome

APN
Production Management & Automation System

Machinery

5-Axis Milling (SIEMENS 840D)
-Alarms
-BLUM Laser Tool Measurements
-Probed Measurements
-Tool Offsets (set & get)
-Tool Life Management
-WPC Coordinates (set & get)
-Machining Times & Part Counts

Turning (FANUC 18i-TB & 30i-A)
-Alarms
-Tool Offsets (set & get)
-WPC Coordinates (set & get)
-Tool Load Values
-Tool Offsets
-Tool Life Management

Grinding (COMBITEC ACS400 & FANUC 31i-A)
-Alarms
-Tool Offsets (get)
-Probe Measurements
-Program Start/Stop/Change

CMM (ZEISS & MITUTOYO)
-Measurement Reports

Server

SQL Database
-Store & Dispense Information
-Sampling Logic & Data Statistics

Server Application
-Live Data Importation
-Machine Communication
-Update Broadcasting

Client Application
-Creates/Displays Messages
-Control of Inspection Frequency
-Event Input and Relay
-Information Lookup
-Project Definition
-Output Filled Inspection Sheets
-Live Monitoring of Job Risk

Users

Machinist
-Enter Measurements
-Complete Tasks
-Monitor Process Variables & Machine
-See Associations for Available Data
-Get Information from Previous Projects
-Process Control Allows for Increase in Stability & Decrease in Required Inspection
-Receive Targeted Notifications
-Add process information

Programmer
-Define Projects, Characteristics, Programs, Tools, & Entity Associations
-Lookup Database of Old Projects for Tools, Speeds & Feeds for Specific Features and Materials

Quality
-Monitor Incoming CMM Load and Current Jobs
-View, Handle, and Search Non-Conformities and Counter-Validations
-Generate Process Reports

Floor Supervisor
-Alerted of Higher Importance Events
-Easily Monitor All Running Jobs and Machines
-Predictive Process Statuses
-Quickly Diagnose Problems
-Correctly Assign Jobs Based on Risk

Existing Software

PowerMill
-Tools
-Toolpaths
-Tool/Toolpath to Characteristic Associations
-Toolpath to Feature Type Association

FeatureCam
-Tools & Toolpaths

SimCT
-Grinding Cycles

JobBOSS
-Jobs
-Employees
-Tools
-Job Operations
-Materials
-Measuring Tools & Calibration

UniPoint
-Non-Conformances

InspectionXpert
-Characteristics

Project | Characteristics | Operations | Programs | Jobs | Recipes | Contract Review | Tool List | Tooling Editor | Legacy Tool List | Associations

Editable Characteristics | Characteristic History

#	Suffix	Type	Dimension	Tol Type	Tol Val 1	Tol Val 2	Flags
1		Minor	0.00000		0.00000	0.00000	
2		Minor	0.00000		0.00000	0.00000	
3		Minor	0.00000		0.00000	0.00000	
4		Minor	0.00000		0.00000	0.00000	
5		Minor	0.00000		0.00000	0.00000	
6		Minor	0.00000		0.00000	0.00000	
7		Minor	0.00000		0.00000	0.00000	
8		Minor	0.00000		0.01500	0.00300	
9	1	Minor	0.00000		0.07800	0.04700	
9	2	Minor	0.00000		0.07800	0.04700	
10		Minor	0.00000		0.00000	0.00000	
11		Minor	0.00000		0.00000	0.00000	
12		Minor	0.00000		0.00000	0.00000	
13		Minor	0.00000		0.00000	0.00000	
14		Minor	0.00000		0.00000	0.00000	
15		Major	37.00000		0.01667	0.00000	
16		Minor	0.00000		0.00000	0.00000	
17		Minor	0.00000		0.00000	0.00000	
18		Minor	0.00000		0.00000	0.00000	
19	1	Minor	0.01000		0.00000	0.00000	
19	10	Minor	0.01000		0.00000	0.00000	
19	11	Minor	0.01000		0.00000	0.00000	
19	12	Minor	0.01000		0.00000	0.00000	
19	2	Minor	0.01000		0.00000	0.00000	
19	3	Minor	0.01000		0.00000	0.00000	
19	4	Minor	0.01000		0.00000	0.00000	
19	5	Minor	0.01000		0.00000	0.00000	
19	6	Minor	0.01000		0.00000	0.00000	
19	7	Minor	0.01000		0.00000	0.00000	
19	8	Minor	0.01000		0.00000	0.00000	
19	9	Minor	0.01000		0.00000	0.00000	
20		Minor	0.00000		0.00000	0.00000	
21		Minor	0.00000		0.00000	0.00000	
22		Minor	0.00000		0.00000	0.00000	
23		Minor	0.02000		0.00000	0.00000	
24	1_Max	Minor	0.00000		0.74900	0.72900	
24	1_Min	Minor	0.00000		0.74900	0.72900	
24	2_Max	Minor	0.00000		0.74900	0.72900	
24	2_Min	Minor	0.00000		0.74900	0.72900	
24	3_Max	Minor	0.00000		0.74900	0.72900	
24	3_Min	Minor	0.00000		0.74900	0.72900	
25		Minor	0.00000		0.00000	0.00000	
26		Minor	0.00000		0.00000	0.00000	
27	1_Max	Minor	0.60900		0.00000	0.00600	

= Modified   = Assigned to an operation   = Multiple operations
= Added   = Inspection tool
= Saved   = Automated measurement

Add | Delete | Cancel | Save

Characteristic Properties

Number: 19   Suffix: 11   Include in FAI: ☑

Measurement Type: True Position   Risk: 1   Characteristic Type: Minor

Description
UOS ALL DIAMETER

Preview

MINOR   Desc.: UOS ALL DIAMETER

19.11   True Position
0.01^{max}

Min : 0.00 %   Max : 20.00 %

Tolerance

Symeteric ☐

Warning Max: 20.00000   Delt: 0.00200
Warning Min: 0.00000   Delt: 0.00000
Tolerance Type: Max
Dimension: 0.01000

Calculated Values

Max: 0.01000
Warn Max: 0.008000000
Nominal: 0.01000
Warn Min: 0.0
Min: 0.0

Export | Save All

Ready

APN (FCP_DB_APN)   USER 100 - Yves Proteau

8:26 PM
11/03/2018

APN Production Manager

Tasks | NCs | Project Info

PART NO. [44] GO

Sort by: [Characteristic]
Filter: [ALL]

Login

PART	TASK TYPE	STOPS PRO
48	CMM_Measurement CMM	☐

MINOR
Overridden
2
EB
Desc.: BREAK ALL SHARP CORNERS R.010MAX U.O.S.
Visuel Visuel
1 : 2 next: 44
Break edges
Ok
Δ :

CRITICAL
Overridden
14
_
Desc.: Ø.503
Bore gage Diamet
1 : 4 next: 44
Diameter
0.503 + 0.001
Min : 20.01 % Max : 20.01 %
Δ : -0.00050
CPK
Actual: 2.79 (11) ●
Last ten: 3.66 (10) ●
Last job: 1.69 (60) ●

MINOR
Overridden
15
R_
Desc.: Fini 4 Ra MAX
Insp. Cond.: Polir Pâte BLEU pour un Fini Uniform
Visuel Visuel
1 : 2 next: 44
Surface Finish
Ok
Δ :

MINOR
Overridden
18
L
Desc.: Land du Ø.479
Insp. Cond.: High to High
Bore gage Diamet
1 : 2 next: 44
Length
0.090 ± 0.005
Min : 5.00 % Max : 5.00 %
Δ : 0.00000
CPK
Actual: 3.70 (22) ●
Last ten: 4.85 (10) ●
Last job: 1.41 (116) ●

MINOR
Overridden
20.2
r
Desc.: R1/8 Visible à la loupe
Insp. Cond.: Sinon Polir Pâte BLEU
Visuel Visuel
1 : 2 next: 44
Radius
Ok
Δ :

CRITICAL
Overridden
24
_
Desc.: Ø.479
Bore gage Diamet
1 : 2 next: 44
Diameter
0.479 + 0.001
Min : 20.01 % Max : 20.01 %
Δ : -0.00050
CPK
Actual: 2.91 (22) ●
Last ten: 4.30 (10) ●
Last job: 1.55 (118) ●

Additional Characteristics

MEASUREMENTS TO RECORD

SUBMIT »

JOB 1041... RECIPE 78727
OP Combi-3-M1
PART PT31110 REV -

100
Die, Lower, initial Draw
Yves Proteau   44 / 230
JOB OPERATION OPEN

Ready
FCP_DB_APN   USER 100 - Yves Proteau

Start

3:20 PM
18/06/2017

APN Production Manager

PART	DATE	EMPLOYEE	EVENT TYPE	DETAIL
0	16/06/2017 11:53:32 AM	229	Job_Operation_Started	
0	16/06/2017 11:53:56 AM	229	Inspection_Tool_Selected	
1	16/06/2017 12:27:03 PM	229	Measurement	
2	16/06/2017 12:46:01 PM	229	Measurement	
4	16/06/2017 1:38:08 PM	229	Measurement	
6	16/06/2017 10:53:46 PM	277	Measurement	
8	16/06/2017 11:50:47 PM	277	Measurement	
10	17/06/2017 2:24:25 AM	277	Measurement	
12	17/06/2017 2:24:42 AM	277	Measurement	
14	17/06/2017 2:24:55 AM	277	Measurement	
16	17/06/2017 5:08:10 AM	277	Measurement	

Event Type Filters
- Start Timed Event
- Skip Part
- Consecutive Jobs
- Finish Job Operation
- Return Tools

Login

PART	TASK TYPE	STOPS PROD
48	CMM_Measurement CMM	

2	Visuel: Visuel / View All	BREAK ALL SHARP CORNERS R.010MAX U.O.S.	EB	Ok	ok Δ N/A
9	Palpeur: 0.0001" / View All	Perpendicularité | .001 | A	j	0.001 max	0.00030 Δ MAX -0.00070
14	Bore gage: Diamet / View All	Ø.503	R i	0.503 +0.001	0.50360 Δ NOM +0.00010
15	Visuel: Visuel / View All	Fini 4 Ra MAX	L	Ok	ok Δ N/A
16	CMM: Zeiss / View All	12°	L	12.0 ±0.5	11.97391 Δ NOM -0.02609
18	Bore gage: Diamet / View All	Land du Ø.479	r	0.090 ±0.005	0.09100 Δ NOM +0.00100
19	Bore gage: Diamet / View All	Longueur 15°	r	0.062 ±0.015	0.06300 Δ NOM +0.00100
20.1	Comparateur optique ac / View All	R1/8	r	0.125 ±0.015	0.12500 Δ NOM +0.00000
20.2	Visuel: Visuel / View All	R1/8 Visible à la loupe	r	Ok	ok Δ N/A
24	Bore gage: Diamet / View All	Ø.479	_	0.479 +0.001	0.47950 Δ NOM +0.00000
27	Bloc en V: Bloc en V acie / View All	Concentricité | .002 | A	o	0.002 max	0.00030 Δ MAX -0.00170

EVENTS VIEWER

JOB 1041... RECIPE 78727
OP Combi-3-M1
PART PT31110 REV -

100
Yves Proteau

Die, Lower, initial Draw
44 / 230
JOB OPERATION OPEN

Ready

FCP_DB_APN USER 100 - Yves Proteau

3:21 PM
18/06/2017

Events | Characteristics | Measurements | Tools Offsets | Setup | Associations

Tasks | NCs | Project Info

Login

PART	TASK TYPE	STOPS PROI
48	CMM_Measurement CMM	☐

2 MINOR Overridden EB
Desc.: BREAK ALL SHARP CORNERS R.010MAX U.O.S.
Visuel Visuel
1 : 2 next: 44
Break edges
Ok
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42

9 CRITICAL Overridden j
Desc.: Perpendicularité | .001 | A
Insp. Cond.: Inspecter 100% Machine
1 : 16 next: 48
Perpendicularity
0.001 max
Min : 0.00 %   Max : 20.01 %
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32
0.00100
CPK
Actual: 4.23 (3) ●
Last ten 4.78 (10) ●
Last job 5.09 (16) ●

12 MINOR Overridden r
Desc.: R1/16
Comparateur o...
Coulé de Cerrolow
1 : 32 next: 64
Radius
0.062 ± 0.015
Min : 7.50 %   Max : 7.50 %
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32
0.07700
0.06200
0.04700
CPK
Actual: N/A (2)
Last ten inf (10) ●
Last job inf (8) ●

13 CRITICAL Overridden o
Desc.: Concentricité | .001 | A
Palpeur 0.0001"
Machine + Pièce...
1 : 64 next: 64
Concentricity
0.001 max
Min : 0.00 %   Max : 20.01 %
1
0.00100
CPK
Actual: N/A (1)
Last ten inf (10) ●
Last job inf (5) ●

14 CRITICAL Overridden _
Desc.: Ø.503
Bore gage Dia...
1 : 4 next: 44
Diameter
0.503 + 0.001
Min : 20.01 %   Max : 20.01 %
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
0.50400
0.50350
0.50300
CPK
Actual: 2.79 (11) ●
Last ten 3.66 (10) ●
Last job 1.69 (60) ●

15 MINOR Overridden R
Desc.: Fini 4 Ra MAX
Insp. Cond.: Polir Pâte BLEU pour un Fini Uniform
Visuel Visuel
1 : 2 next: 44
Surface Finish
Ok
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42

16 MAJOR Overridden i
Desc.: 12°
CMM Zeiss
1 : 16 next: 48
Angle
12.0 ± 0.5
Min : 20.01 %   Max : 20.01 %
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32
12.50000
12.00000
11.50000
CPK
Actual: 3.84 (3) ●
Last ten 6.48 (10) ●
Last job 6.39 (16) ●

18 MINOR Overridden L
Desc.: Land du Ø.479
Insp. Cond.: High to High
Bore gage Dia...
1 : 2 next: 44
Length
0.090 ± 0.005
Min : 5.00 %   Max : 5.00 %
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42
0.09500
0.09000
0.08500
CPK
Actual: 3.70 (22) ●
Last ten 4.85 (10) ●
Last job 1.41 (116) ●

MINOR   Desc.: Longueur 15°   1 : 16 next: 48   0.07700   CPK

☐ Select ALL   Generate Inspection Sheet

JOB 1041...   RECIPE 78727
OP   Combi-3-M1
PART PT31110   REV -
100
Die, Lower, initial Draw
Yves Proteau   44 / 230
JOB OPERATION OPEN

Ready

FCP_DB_APN   USER 100 - Yves Proteau

3:19 PM
18/06/2017

WC	2h Ratio	2h Timeline	24h Ratio	24h Timeline

Combitec 1
65 % 8:47 AM 7:00 AM
55 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

Combitec 2
59 % 8:47 AM 7:00 AM
82 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

Combitec 3
31 % 8:47 AM 7:00 AM
69 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

Combitec 4
60 % 8:47 AM 7:00 AM
88 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

Decoupe
0 % 8:47 AM 7:00 AM
3 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

KX10
86 % 8:47 AM 7:00 AM
50 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

K2X8-1
88 % 8:47 AM 7:00 AM
37 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

K2X8-2
71 % 8:47 AM 7:00 AM
33 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

K2X8-3
55 % 8:47 AM 7:00 AM
50 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

MX4-1
93 % 8:47 AM 7:00 AM
49 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

MX4-2
89 % 8:47 AM 7:00 AM
74 % 7:00 AM 2:00 AM 7:00 PM 4:00 PM 12:00 PM

Takumi 1

Start

8:47 AM
21/09/2017

APN Production Manager

☐ Show All Workcenters   Scheduling Type: Machine Scheduling   Departments: [ ]   Work Center: TOURNAK6   Print Department   Print All Work Center Scheduling (Compact)   Time Range: 21/12/2017

TOURNAK6   Capacity (for 7 days): 177 h   Running Auto:%0

Filter by Usr. [ ]

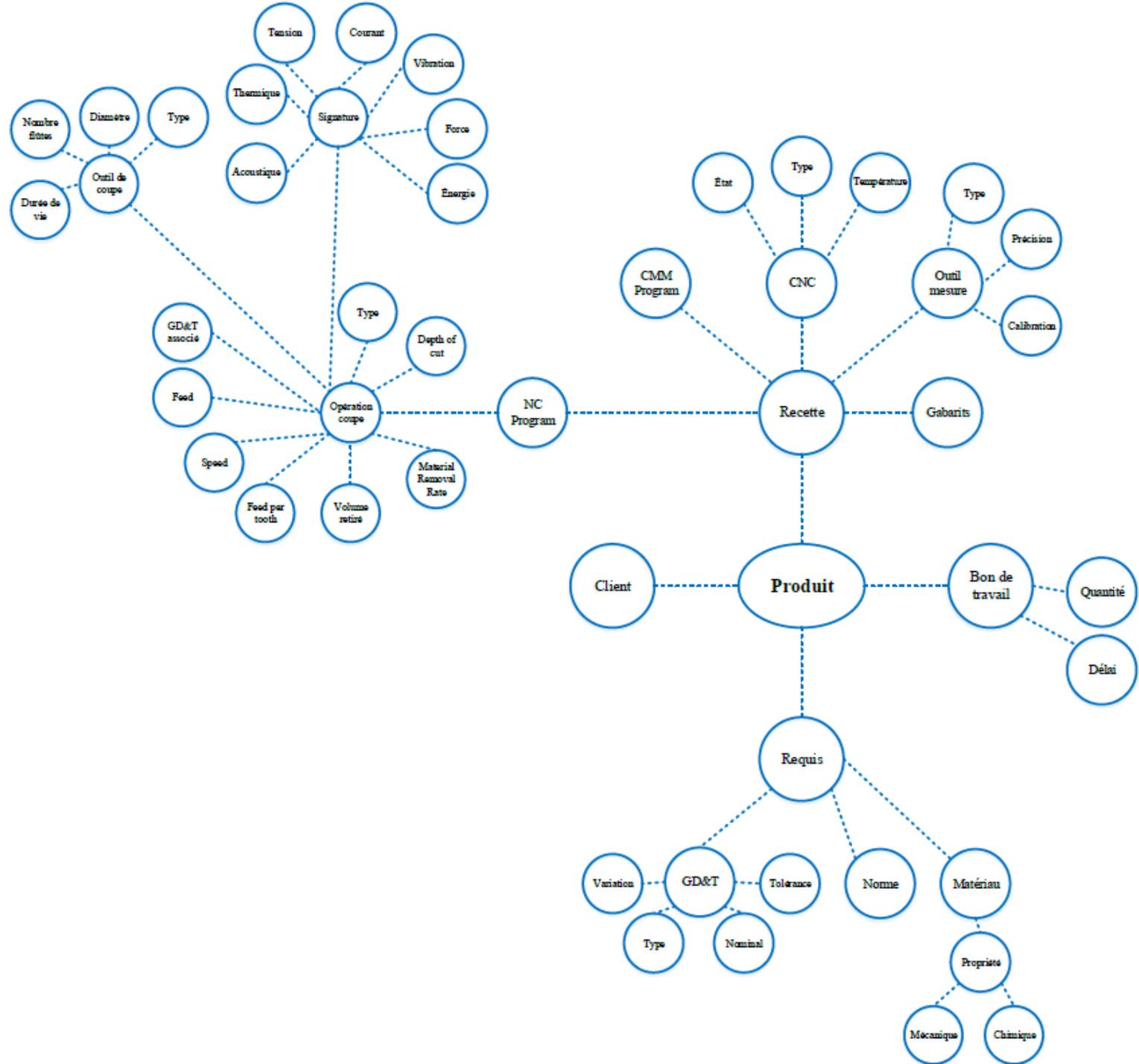|		Tasks Status	Job Nb.	Seq.	Part Name	Rev	Usr.	Est. End.	Sched. End.	Qty.	% Qty.	Est. Setup	Act. Setup	Mach. Setup	In job. Setup	% Setup	Est. Run	Act. Run	% Run	% Perf	Current WC	Attd.	Eff.	Open NCs	NCs	
	1	Details		109763	1	EA00-7022-0200	D		22/09/2017 06:43	21/08/2017	342 / 450	%76	8	41.6	26.2	15.4	%19	75	69.5	%93	%82	TOURNAK6	100	100	18	0	
	2	Details		108624	5	RV00-0194-0700	E		24/09/2017 08:23	02/08/2017	0 / 200	%0	4	0.0	0.0	0.0	%0	16.67	0	%0	%0	TOURNAK6	100	100	0	0	
	3	Details		108625	2	RV00-0194-0700	E		25/09/2017 14:03	29/08/2017	0 / 200	%0	0	0.0	0.0	0.0	%0	16.67	0	%0	%0	2WAIT	100	100	0	0	
	4	Details		108626	2	RV00-0194-0700	E		26/09/2017 06:44	11/09/2017	0 / 200	%0	0	0.0	0.0	0.0	%0	16.67	0	%0	%0	2WAIT	100	100	0	0	
	5	Details		109497	1	FCH-S200-0B0	A		27/09/2017 02:44	25/08/2017	0 / 100	%0	5	0.0	0.0	0.0	%0	15	0	%0	%0	TOURNAK6	50	100	0	0	
	6	Details		103323	1	MG60-0400-0700	F		01/10/2017 14:39	23/08/2017	0 / 350	%0	6	0.0	0.0	0.0	%0	72.92	0	%0	%0	TOURNAK6	65	70	0	0	
	7	Details		103530	1	MG60-0400-0700	F		05/10/2017 04:34	04/10/2017	0 / 350	%0	0	0.0	0.0	0.0	%0	72.92	0	%0	%0	DECOUPE	65	70	0	0	
	8	Details		103324	1	MGX0-0400-0700	C		14/10/2017 11:34	13/10/2017	0 / 800	%0	8	0.0	0.0	0.0	%0	120	0	%0	%0	DECOUPE	65	100	0	0	
	9	Details		104071	1	EL60-0200-0200	E		16/10/2017 18:11	11/09/2017	0 / 300	%0	6	0.0	0.0	0.0	%0	23.61	0	%0	%0	DECOUPE	50	90	0	0	
	10	Details		104070	1	EL60-0200-0200	E		17/10/2017 17:47	11/09/2017	0 / 300	%0	0	0.0	0.0	0.0	%0	23.61	0	%0	%0	DECOUPE	50	90	0	0	
	11	Details		104203	1	ELX0-0200-0200	C	Mqs	20/10/2017 03:47	05/10/2017	0 / 600	%0	6	0.0	0.0	0.0	%0	52	0	%0	%0	DECOUPE	65	85	0	0	
	12	Details		109500	1	FEH-F2S2-MB0	A		25/10/2017 07:06	27/09/2017	0 / 300	%0	12	0.0	0.0	0.0	%0	69.31	0	%0	%0	DECOUPE	50	101	0	0	
	13	Details		109504	2	FEM-F4S2-MD0	A		26/10/2017 07:10	03/10/2017	0 / 50	%0	8	0.0	0.0	0.0	%0	16.07	0	%0	%0	2WAIT	100	70	0	0	
	14	Details		107233	1	FEM-F4L2-MB0	A		31/10/2017 22:38	28/09/2017	0 / 500	%0	8	0.0	0.0	0.0	%0	85.46	0	%0	%0	DECOUPE	50	90	0	0	
	15	Details		107234	1	FEM-F4L2-MB0	A		05/11/2017 17:05	18/10/2017	0 / 500	%0	0	0.0	0.0	0.0	%0	85.46	0	%0	%0	DECOUPE	50	90	0	0	
	16	Details		102128	1	FEH-F4L4-OB0	A		07/11/2017 20:25	05/11/2017	0 / 200	%0	5	0.0	0.0	0.0	%0	33.33	0	%0	%0	TOURNAK6	50	100	0	0	
	17	Details		104859	1	FAD-RAS2-MB0	00		11/11/2017 14:05	16/10/2017	0 / 500	%0	6	0.0	0.0	0.0	%0	66.67	0	%0	%0	DECOUPE	50	100	0	0	
	18	Details		104204	1	ELX0-0200-0200	C		15/11/2017 01:05	19/10/2017	0 / 600	%0	6	0.0	0.0	0.0	%0	52	0	%0	%0	DECOUPE	65	85	0	0	
	19	Details		109764	1	EA00-7022-0200	D		18/11/2017 12:45	20/11/2017	0 / 400	%0	0	0.0	0.0	0.0	%0	66.67	0	%0	%0	DECOUPE	100	100	0	0	
	20	Details		102134	1	FUH-S2S2-MB0	A		21/11/2017 12:50	23/10/2017	0 / 300	%0	5	0.0	0.0	0.0	%0	42.08	0	%0	%0	TOURNAK6	50	101	0	0	

Drop here to add at the end of the list.

Total Setup (hrs): 93   Run (hrs): 1022.12   Remaining Run (hrs): 952.62

Save Work Center Scheduling | Print Work Center Scheduling | Group Schedules Per Part

⌄ Unprioritized Schedules

Ready   FCP_DB_APN   USER 100 - Yves Proteau

Start   8:51 AM 21/09/2017

= 1 meg

APN ➡️ IA ???

- **Compensation automatique**
- **Achats optimaux**
- **Planification dynamique**
- **Mesure optimale**
- **Cobotisation**
- **Intégration totale**
- **Maintenance prédictive**