

Engineering

TCS - Cummins Confidential

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KBE Automation - Building Code Evaluation

Business Problem: Unavailability of single source of platform to evaluate key site load factors during ITO and OTR.

TCS Solution: A digital tool using Angular JAVA for evaluating Seismic, Wind, and Snow load factor for Gas, Steam Turbine and its accessories. Enables informed decision making based on site considerations.

Site Parameter Report

Seismic Report

Wind Load Report

Snow Load Report

IPS Number	Project Name	Location	GT Frame	ST Frame	Country	IBC Details	Project Status	Update	Delete	Print	Last Modified By
52	juitjuh	tr	tr	tr	USA	IBC 2015	Approved				
77	tt	t	rt	tt	USA	IBC 2015	Approved				
91	new	india	gt1	st1	USA	IBC 2015	Approved				
165	esi	546	56		USA	IBC 2009	Approved				
478	568	568	496		USA	IBC 2015	Approved				
555	dwdwd	dwdwd	262dw	262d6w	USA	IBC 2009	Approved				
678	ytu	rioo		nui	USA	IBC 2015	Approved				Jose(jose)
898	jhj	kl	gf	gf	USA	IBC 2015	Approved				
2134	asdf	asdf	asdf		USA	IBC 2015	Approved				

Longitude: 11 Latitude: []

Site Parameters Seismic Load Wind Load Snow Load

Site Parameters

Seismic (Seismic Load Reference) :

Spectral Response Acceleration at a period of 1s(Ss): 0.5

Spectral Response Acceleration at short periods(S1): 0.5

Site Class : B TABLE 20.3-1

Soil Profile Description: Rock TABLE 20.3-1

Building Occupancy Category: II

Occupancy Importance Factor(I): 1.00 TABLE 11.5-1

Technologies

Global Platform

Fully automated

Single source of data

Data Analytics

Knowledge Repository

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Automation of Pressure Equipment Directive (PED) BOM and Report

Move away from legacy manual processes to automated processes

Legacy Process



USE FOR STAINLESS STEEL

Input the values in cells with orange fill

Pipe Description	Nom Pipe Size	Sch	Outside Diameter (in)	Wall Thickness (in)	Wall Thick Reduce d 12.5%	t (in)	c (in)	tm (in)	Margin = (Avail/Min)	Is pipe thickness sufficient
Straight Pipe	16	40S	16.000	0.375	0.328	0.072	0.000	0.072	0.257	YES
LR Bends	16.000	24.000	R1	R1/D	I inside	t outside	t outside	tm	Margin	YES
			1.500	1.250	0.875	0.089	0.063	0.089	0.786	YES
SR Bends	16.000	16.000	R1	R1/D	I inside	t outside	t outside	tm	Margin	YES
			1.000	1.500	0.833	0.107	0.050	0.107	0.726	YES
2D Bends	16.000	32.000	R1	R1/D	I inside	t outside	t outside	tm	Margin	YES
			2.000	1.167	0.900	0.063	0.064	0.063	0.817	YES
Straight Pipe	3	40S	3.500	0.216	0.189	0.016	0.000	0.016	0.173	YES
LR Bends	3.000	4.500	R1	R1/D	I inside	t outside	t outside	tm	Margin	YES
			1.286	1.318	0.960	0.054	0.010	0.054	0.766	YES
SR Bends	3.000	3.000	R1	R1/D	I inside	t outside	t outside	tm	Margin	YES
			0.857	1.700	0.816	0.121	0.003	0.121	0.694	YES
2D Bends	3.000	6.000	R1	R1/D	I inside	t outside	t outside	tm	Margin	YES
			1.714	1.206	0.867	0.086	0.003	0.086	0.801	YES

Technologies

Automated Process

Automation of (PED) BOM

- BOM Automation
- Pipe Thickness Calculation
- PED Category Wizard

Report Generation

- Technical file Cover Sheet
- Material Pressure Validation report
- Simplified BOM

Technologies

- Java
- Tomcat
- Digital Store

Benefits

- Improves productivity
- Eliminates manual errors
- Eliminates manual efforts

PED BOM Automation Tool HOME

Download All Reports

Compliance Tech File | Technical File | Design Summary Sheet

PED BOM Automation | Pipe Thickness Calculation | PED Category Wizard

Input Details

Project Name: F07235 | Project Frame: T5A
 Unit Serial Number: 2394 | MJ Name: A100
 MJ Description: Accessory V | HSB Application Number: HSB025
 System Schematic Number: 12714653 | GE Part Number: 18774551

Unit Location: Indoor Outdoor
 Min Ambient Temperature: 15 C 59 F
 Max Ambient Temperature: 40 C 104 F

Design Details
 Design Temperature(Min): 200 C 392 F
 Design Temperature(Max): 40 C 104 F
 Design Pressure(P): 65 bar 952.07 psi
 Fluid: Gas Group Type: Type 2
 Wind Load: 55 Seismic Load: 45

ASME Details

Piping
 Allowable Stress Cold(Max)(K ASME B31.3) (Sc): 15 ksi 15000 psi
 Allowable Stress Hot(Max)(K ASME B31.3) (Sh): 15 ksi 15000 psi
 Material Used For Piping: ASME SA182 F304/F304L Check, To change the default value

Flange
 Available Materials: ASME SA182 F316/F316L
 Selected Materials: ASME SA182 F304/F304L, ASME SA182 F304/F304L, ASME SA182 F304/F304L

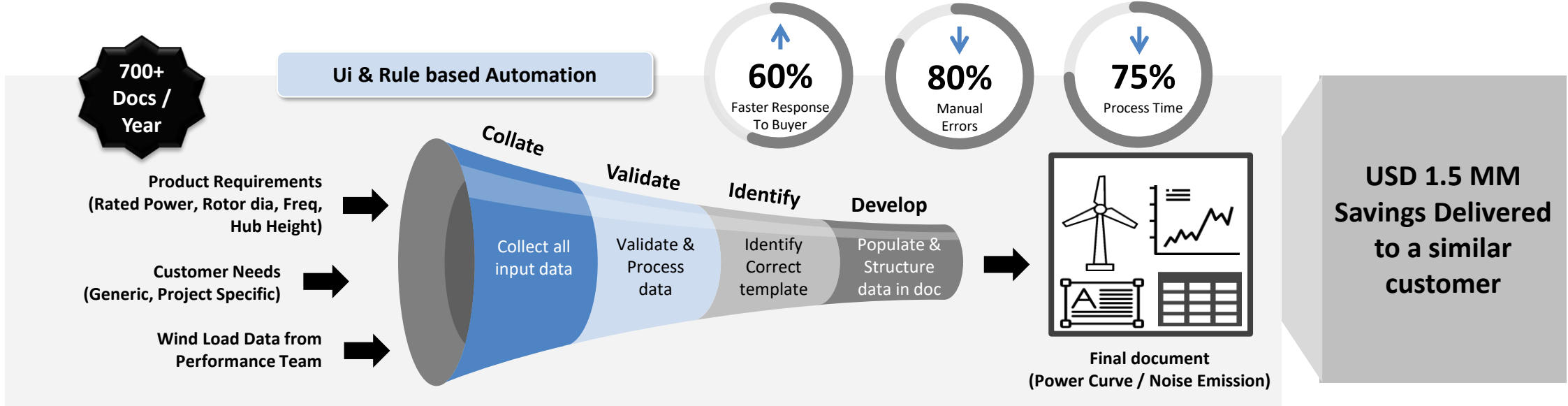
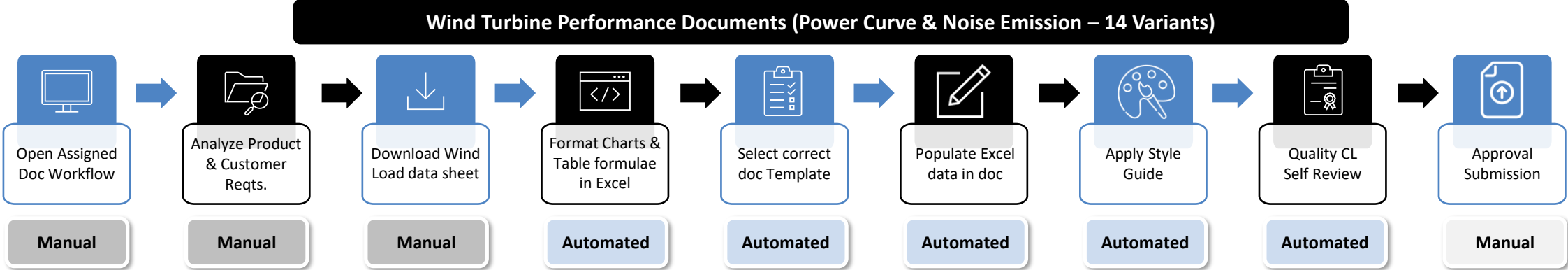
Fitting
 Material: A403 WP304/F304L Check, To change the default value
 Quality Factor (A-1B ASME B31.3) (E): 1.0 Check, To change the default value
 Weld Joint Strength Reduction Factor(ASME B31.3) (W): 1.0 Check, To change the default value
 Coefficient(A-1B ASME 31.3) (Y): 0.4 Check, To change the default value
 Corrosion Allowance (c): 0.0 Check, To change the default value

Upload BOM: (Upload .xlsx files only And File should be in default view of PLM)

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Technical Publications – Performance Docs Automation Solution

End to end automation of technical contents management workflows related to product performance management



Helps in Technical and Service literature creation and management across the business units

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Automation of Piping Stress Analysis Report Generation

Business Problem

- Piping stress analysis for all critical lines of Gas turbine accessories for GE Power is being carried out in Autopipe and the final output will be in the form of a report (MS Word). For Report creation, it takes an average of 48 hours to generate the report.
- For complex piping, this report submission and reworking the report, any change done in the model during the review takes more time.
- Often, we face challenges in extracting Forces and moments, Critical nodes, and Displacement extraction.
- Currently, we manually analyze and enter the values from Auto pipe in the report. Every Report consumes more time for creation and update (If any) based on review comments.

TCS Solution

Developed an automation tool using VBA to capture Displacement, Forces & moment, and Critical Node directly from Autopipe output file (.CSV). Processing the key displacement data, consolidating them and generating results are automated as shown below.

- Result displacement in nodes with max values indicated with load cases.
- Critical nodes in dynamic analysis are identified and reported for corresponding modes and shapes.
- Forces and moments for required node indicated with load cases.

SUPPORTS	FORCES AND MOMENTS							
	FORCES				MOMENTS			
	Fx	Fy	Fz	Result	Mx	My	Mz	Result
	Max	Max	Max		Max	Max	Max	
A24	-125	119	-351	361	0	0	0	0
	GT4P4(1)	GE3(1)	GE1(1)	GE1(1)	Gravity(1)	Gravity(1)	Gravity(1)	Gravity(1)
B34	0	0	0	0	0	0	0	0
	Gravity(1)	Gravity(1)	Gravity(1)	Gravity(1)	Gravity(1)	Gravity(1)	Gravity(1)	Gravity(1)
A60	-180	-114	-594	621	0	0	0	0
	GT10P10(1)	GE4(1)	GT10P10(1)	GT10P10(1)	Gravity(1)	Gravity(1)	Gravity(1)	Gravity(1)



Business Value

- 3x faster turnaround time to make critical piping design modifications
- Improved quality as a result of 100% automation
- 80% cycle time reduction in report generation

\$ 800K Savings for a similar customer

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