## Knowledgeware Rule-based Clash



Clash rules written using knowledgeware capabilities can be used in a standalone clash process c clash process, ensuring clash analyses take corporate practices into account.

Multiple shape representations are supported letting you define context-specific shapes, for exar shape or an operator shape for a manually-operated valve.

This task shows you how to apply clash rules in interactive interference analysis. This involves the procedures described hereafter:

- Writing clash rules using Knowledge Expert
- Running interference analysis using the Clash command
- Generating Clash Rules Using a Macro
- Knowledgeware Rule-based Clash & ENOVIA LCA

Two samples are provided in online/cfysm\_\*X2/samples:

- Knowledge\_Rule-based\_Clash.CATProduct (contains alternate shapes)
- Rule\_for\_Interference.CATProduct (contains a rule).

Two samples are provided in online/spaug\_\*X2/samples:

- SPE1Rules.xls
- macro1\_clashrules.txt

# Writing Your Clash Rule

Before you begin, make sure you have selected the required packages.

- 1. To customize Knowledgeware settings:
  - Select Tools > Options... command.
  - The **Options** dialog box is displayed.
  - Select General > Parameters and Measure and click the Knowledge Environ
    - Select the Load extended language libraries check box
  - Load the SpaITFCheckMethod package

Lang	uage			
	🧧 Load extended lang	uage lit	oraries	
[	🗌 All packages			
	Packages to load		Loaded packages	
00000	AnalysisBasisPacka 🔺		SpalTFCheckMethod	
	BasicConstraintPac			
	BasicWireframePac			
	BIWFasteners Comparing Deployee	$\Rightarrow$		
	LonstraintPackage			
	DrwPackage	Ŷ		
	Flectrical	<u></u>		
1000	EquipLayout			
		339333		

You need to restart CATIA for this setting to be taken into account. A warning message is prompts you to do so.

- 2. To customize Product Structure settings:
  - Select the **Infrastructure** category, then the **Product Structure** sub-categor **Customization** tab:
  - Activate both **Parameters** and **Relations** options (the Constraints option is : clicking the Activate button

Proc	Product Visualization Reconciliation Tree Customization							
Speci	Specification Tree Order							
	Specification Tree Node Name	Activated	Up					
	Products Node		Down					
	Representations	0	Activate					
	Material Parameters	Yes Ves	Deschuste					
	Relations	Yes	Deactivate					
	Constraints	Yes	1					
	Publications							
	Others							
	Applications	Yes						

You are now ready to write your rule.

- Select Knowledgeware > Knowledge Expert from the Start menu to switch to the Knowle workbench.
- 4. Click **Expert Rule** <sup>224</sup>. The **Rule Editor** dialog box appears.

Rule Editor 🛛 🔀
Name of Rule : Rule.1
Rule created by fbp 12/8/2004
Language : KWE Language
OK Cancel Help

- 5. (Optional) Modify the default rule name and comments. In our example, the rule name is: CATKWERule.3
- 6. Click **OK** when done. The **Rule Editor** appears.

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7. Write your rule. Here is a clash rule example below:

V:p1:Product;p2:Product	
<b>*</b>	
/*Rule created by mtn 15/10/20	)01×/
if (p1 != p2) {	
DefineInterferenceComputation	(p1, p2, "Clearance", 70mm, "WRAPPING", "Shape 1", ThisRule);

(i) For more information about expert rules, see the *Knowledge Expert User's Guide*.

- 8. Click **Apply** to check rule syntax.
- 9. Click **Ok** to add the expert rule to the document
- 10. Click the **Update** icon to solve the rule base. If needed, update the document.
- 11. Save your clash rule in the CATProduct document.

Clash rules must be saved in a separate CATProduct document from the one in which interference analysis.

You can save more than one rule in the CATProduct document. If you do so, do not f priority in the Rule Editor dialog box. When running your interference analysis, rule procunt and if pairs of products and shapes satisfy more than one rule, the results o highest priority only are output.

#### **Running Your Interference Analysis**

12. Identify the location of the document containing the clash rules:

- Select Tools > Options > Digital Mockup > DMU Space Analysis.
- Click the DMU Clash Rule tab.
- Enter the full path for the CATProduct containing the clash rules.
- Click **OK** when done.

DMU Clash - Penetration	DMU Clash - Rule	DMU Clash Publish	DMU Sectioning 👌 🔳			
CATProduct containing Rule(s)						
online_doc_folder\spaug\samples\Rule_for_Interference.CATProduct						

Reminder: A sample document, Rule\_for\_Interference.CATProduct, containing rules is pro

Space Analysis samples folder online/cfysm\_\*X2/samples

- 13. Open the sample document containing alternate shapes: Knowledge\_Rule-based\_Clash.C
- 14. Select Insert > Clash from the menu bar or click Clash Sin DMU Space Analysis toolbar dialog box appears.
- 15. Activate the first Type drop-down list box and select Clash rule.
- 16. Activate the second Type drop-down list box and select the computation type.
- 17. Select the products to check for interference, for example the trigger and the lock.

Check Clash ? 🔀						
Defir	nition					
Name:	Interference.1					
Туре:	Clash rule	Omm Selection 1: 2 products				
	Inside one selection	Selection 2: No selection				
		OK Apply OK Cancel				

18. Click Apply. The Check Clash dialog box expands to show the results. The dialog box iden detected and shows which shapes of which products interfere.

Check Clash						
Definition						
Name: Interference.1						
Type: Clash rule   Omm Selection 1: 2 products						
Inside one selection   Selection   No selection						
Results						
Bumber of interferences: 2 (Clash:2, Contact:0, Clearance:0)						
Filter list: All types 💌 No filter on value 💌 All statuses 💌 🔳						
List by Conflict List by Product Matrix						
No. Product 1 Shape 1 Product 2 Shape 2 Type Value Stat						
1 LOCK (LOCK.1) WRAPPING TRIGGER Shape 1 Clash -8.14 Rel						
2 TRIGGER (TRI WRAPPING LOCK (LO Shape 1 Clash -5.51 Rel						

Note: Since you can only view the results of one product-shape combination at any c **Product** and **Matrix** tabs are not available.

19. Scroll to the right in the List by Conflict tab. The expert rule is also named. .

	List by Conflict	List by Prod	uct Matrix				
[	Shape 1	Product 2	Shape 2	Туре	Value	Status	Rule
ľ	WRAPPING	TRIGGER	Shape 1	Clash	-8.14	Relevant	CATKWERule.3
ſ	WRAPPING	LOCK (LO	Shape 1	Clash	-5.51	Relevant	CATKWERule.3
L							

A Preview window showing shapes in conflict also appears.



#### Generating Clash Rules Using a Macro

You can take advantage of a macro to automate the clash rule creation from an Excel file. The following example will help you to work this out:

macro1 clashrules.txt (macro to be edited accordingly, see extract below:)

```
SAMPLE of VB code to generate Interference Checking rules from a excel file
This code is ONLY AN EXAMPLE to demonstrate how CATIA Automation APIs can
be used to make the rules edition easier.
Notes:
    - excel file will be open
    - rule catproduct will be CREATED
    - rules will be CREATED from excel data
    - rules will be solved
    - rule catproduct will be saved (if already exist, used will be prompted)
    - excel application will be closed
    - rule catproduct is kept open since
Warning: as an example, this code might not manage all customized conditions
    other syntax and separators could be used
```

SPE1Rules.xls (reference file from which the macro will extract the data to generate the c CATProduct document).

A	В	·····	D	E
!EXAMPLE!	STRPlate/Shape 1	PipingPart/Double	ComputationType="Clash":	PiningPart/Envelope
STRPlate/Shape 1		+	PenCandidate=Candidate;	
PipingPart/Double		2	8	RuleName=PipingPart Double
PipingPart/Double			*	AdvCondition=(p1->GetAttrib
PipingPart/Envelope				ClearanceValue=20mm;
	Attribute's name	Role	Default Values	
in comments	RuleName	Rule's name	type1_shape1_type2_shape2_pri	ority
	AdvCondition	condition added (AND) to the standard test if (p1 != p2)		
	ComputationType	Type of computation	"Clash"	
	ClearanceValue	Clearance value	"Omm"	
	PenCandidate	PenetrationCandidate value	Not Candidate	
in cells	Priority	Rule's Priority	1	
		Severity		
cells color		Hard-Hard		
		Soft-Hard		
		Soft-Soft		

Run the macro by selecting **Tools->Macro->Macros...**, selecting the macro, and clicking Run. For more information, refer to Running and Editing Macros in the *Infrastructure User's Guide* 

### Knowledgeware Rule-based Clash & ENOVIA V5

The results of the rule-based clash can be compared to results already stored in ENOVIA V5 and saved back into the ENOVIA LCA database. Storing results in ENOVIA V5 saves both the shape a

To do so, do not forget to select the Retrieve Information From PDM check box in the DMU Clash **Options..., Digital Mockup > DMU Space Analysis**).

For more information on:

Managing representations, see the Product Structure User's Guide.

the Clash command, see Interference Checking & Analysis.



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