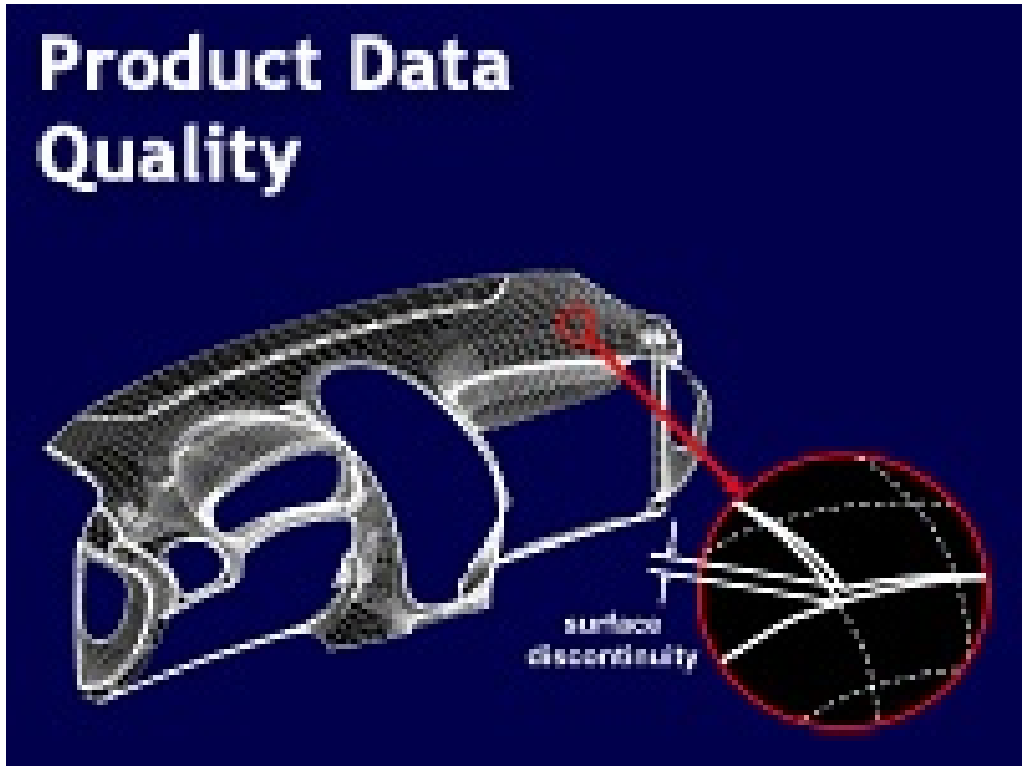
PDQ



Presentation 2006-11-07

Issued by: Mats Söderberg UTIP
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Approved by:
Issue:
Info.class: I

Vad menas med PDQ?

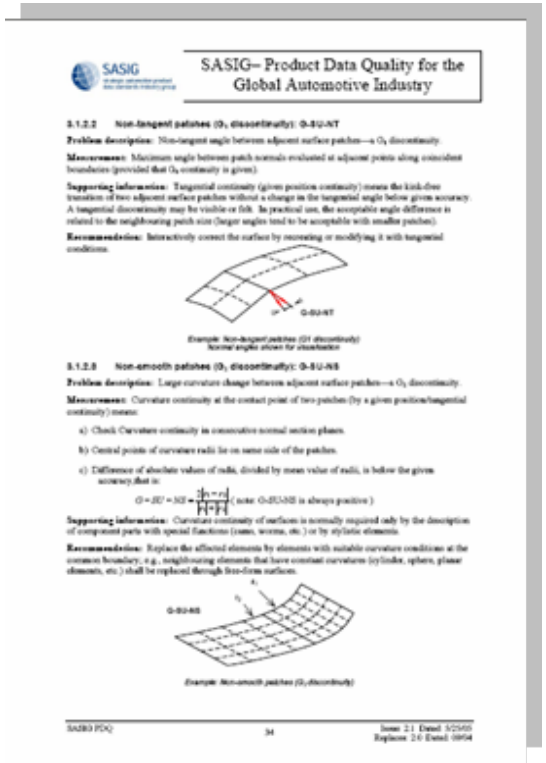
For the purpose of these guidelines, the term ”product data” is defined as any and all product data required from product conception to manufacturing.

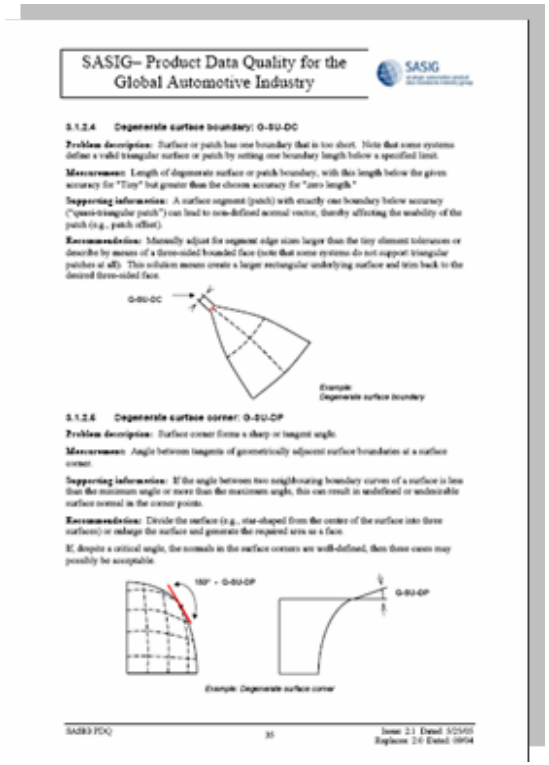
Therefore, product data include not just computer-aided design (CAD) data but also computer-aided manufacturing (CAM) data, computer-aided engineering (CAE) data, product data management (PDM) data, and any other kinds of data

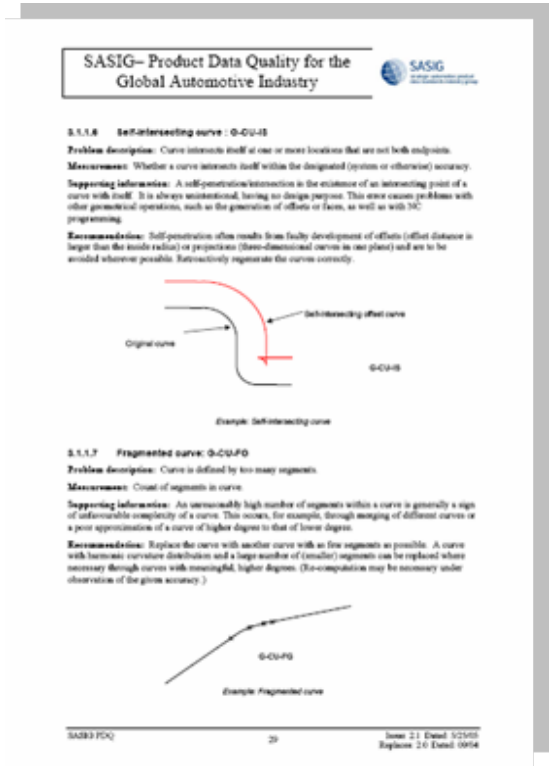
Vad ingår i PDQ idag?

Content marked A appears in this version Content marked B is expected to appear in later versions			Process Chain							
			Define Product	Style Product	Design Product	Evaluate Product	Plan Production	Design Tool	Manufacture Production Tool	Test Tool to Control Quality
Data Class	CAD data	Geometry	Wireframe Model	A	A	A	A	A	A	A	A
			Surface Model	n/a	A	A	A	A	A	A	A
			BREP Solid Model	n/a	A	A	A	A	A	A	A
			CSG Model	n/a	A	A	A	A	A	A	A
		Drawings	2D Drawing	B	B	A	B	B	A	B	B
			Associative Drawing	n/a	B	B	B	B	B	B	B
		Non-geometry	Presentation	B	B	B	B	B	B	B	B
			Parametrics	n/a	B	B	B	B	B	B	n/a
			Features	n/a	B	B	B	B	B	B	B
			Assembly	n/a	B	B	B	B	B	B	B
			Tolerancing	n/a	B	B	B	B	B	B	B
			Surface Condition	n/a	B	B	B	B	B	B	B
			Material Properties	n/a	B	B	B	B	B	B	B
			Parts Information	B	B	B	B	B	B	B	B
			FEA, BEA, …	n/a	n/a	B	B	B	B	n/a	n/a

Exempel på innehåll i PDQ?


SASIG– Product Data Quality for the Global Automotive Industry


SASIG– Product Data Quality for the Global Automotive Industry


SASIG– Product Data Quality for the Global Automotive Industry

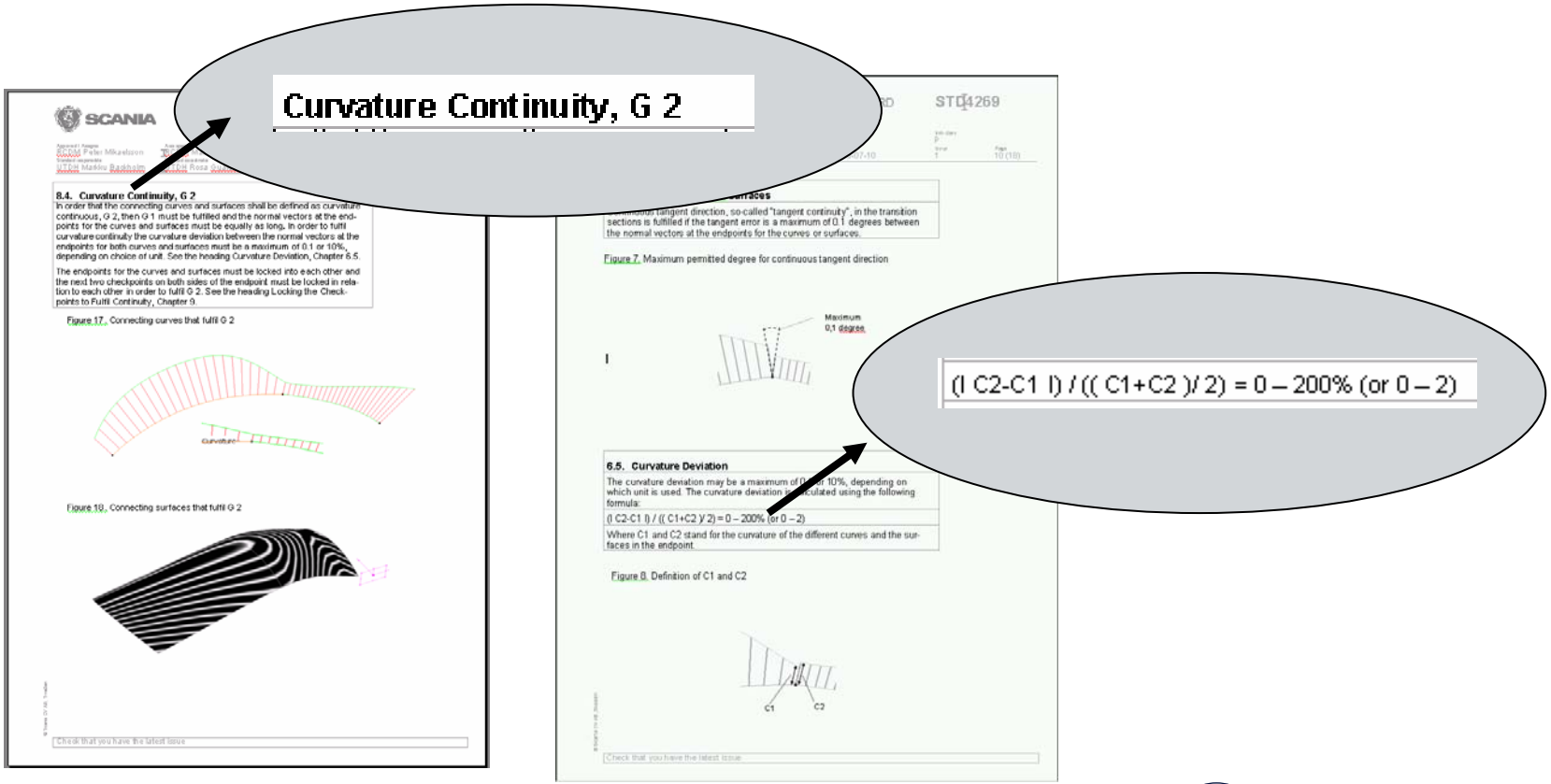
Scania exempel →

PDQ used at Scania

Malin Holmström

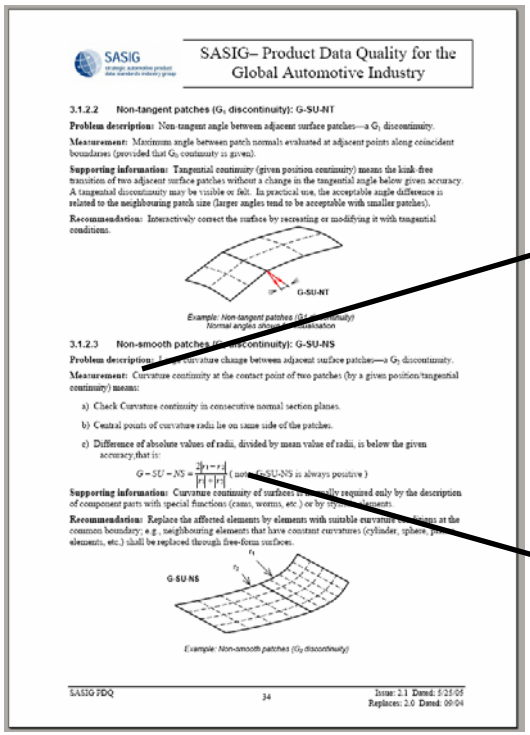
Standard used today at Scania

- **Standard for Catia V4 in classification of surfaces**



Standard definitions in PDQ today

- **The same definition in PDQ**



SASIG– Product Data Quality for the Global Automotive Industry

3.1.2.2 Non-tangent patches (G_1 discontinuity): G-SU-NT

Problem description: Non-tangent angle between adjacent surface patches—a G_1 discontinuity.

Measurement: Maximum angle between patch normals evaluated at adjacent points along coincident boundaries (provided that G_0 continuity is given).

Supporting information: Tangential continuity (given position continuity) means the kink-free transition of two adjacent surface patches without a change in the tangential angle below given accuracy. A tangential discontinuity may be visible or felt. In practical use, the acceptable angle difference is related to the neighbouring patch size (larger angles tend to be acceptable with smaller patches).

Recommendation: Interactively correct the surface by recreating or modifying it with tangential conditions.

G-SU-NT

Example: Non-tangent patches (G_1 discontinuity)
Normal angles above the tolerance

3.1.2.3 Non-smooth patches (curvature discontinuity): G-SU-NS

Problem description: Local curvature change between adjacent surface patches—a G_2 discontinuity.

Measurement: Curvature continuity at the contact point of two patches (by a given position/tangential continuity) means:

a) Check Curvature continuity in consecutive normal section planes.

b) Central points of curvature radii lie on same side of the patches.

c) Difference of absolute values of radii, divided by mean value of radii, is below the given accuracy,that is:

$$G-SU-NS = \frac{2|r_1 - r_2|}{|r_1| + |r_2|}$$ (note: G-SU-NS is always positive)

Supporting information: Curvature continuity of surfaces is usually required only by the description of component parts with special functions (cams, worms, etc.) or by styling elements.

Recommendation: Replace the affected elements by elements with suitable curvature conditions at the common boundary; e.g., neighbouring elements that have constant curvatures (cylinder, sphere, plane elements, etc.) shall be replaced through free-form surfaces.

G-SU-NS

Example: Non-smooth patches (G_2 discontinuity)

SASIG PDQ 34 Issue: 2.1 Dated: 5/25/05 Replaces: 2.0 Dated: 09/04

G_2

Measurement: Curvature continuity

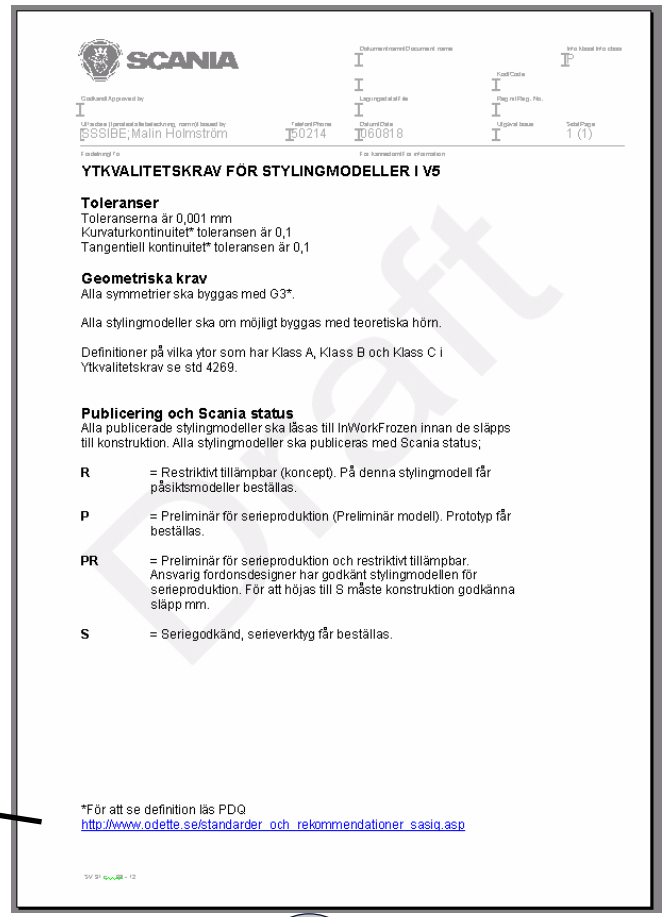
$$G-SU-NS = \frac{2|r_1 - r_2|}{|r_1| + |r_2|}$$

Tomorrow: Using standards and PDQ together at Scania

Using PDQ with some complements, for example in the areas of tolerance, setting, limit values

- **Different user gives different tolerance and limit value**

*För att se definition läs PDQ
http://www.odette.se/standarder_och_rekommendationer_sasig.asp



SCANIA

SSIBE, Malin Holmström 50214 060818 1 (1)

YTKVALITETSKRAV FÖR STYLINGMODELLER I V5

Toleranser
Toleranserna är 0,001 mm
Kurvaturkontinuitet* toleransen är 0,1
Tangentiell kontinuitet* toleransen är 0,1

Geometriska krav
Alla symmetrier ska byggas med G3*.

Alla stylingmodeller ska om möjligt byggas med teoretiska hörn.

Definitioner på vilka ytor som har Klass A, Klass B och Klass C i Ytkvalitetskrav se std 4269.

Publicering och Scania status
Alla publicerade stylingmodeller ska låsas till InWorkFrozen innan de släpps till konstruktion. Alla stylingmodeller ska publiceras med Scania status;

R = Restriktivt tillämpbar (koncept). På denna stylingmodell får påsiktsmodeller beställas.

P = Preliminär för serieproduktion (Preliminär modell). Prototyp får beställas.

PR = Preliminär för serieproduktion och restriktivt tillämpbar. Ansvarig fordonsdesigner har godkänt stylingmodellen för serieproduktion. För att höjas till S måste konstruktion godkänna släpp mm.

S = Seriegodkänd, serieverktyg får beställas.

Draft

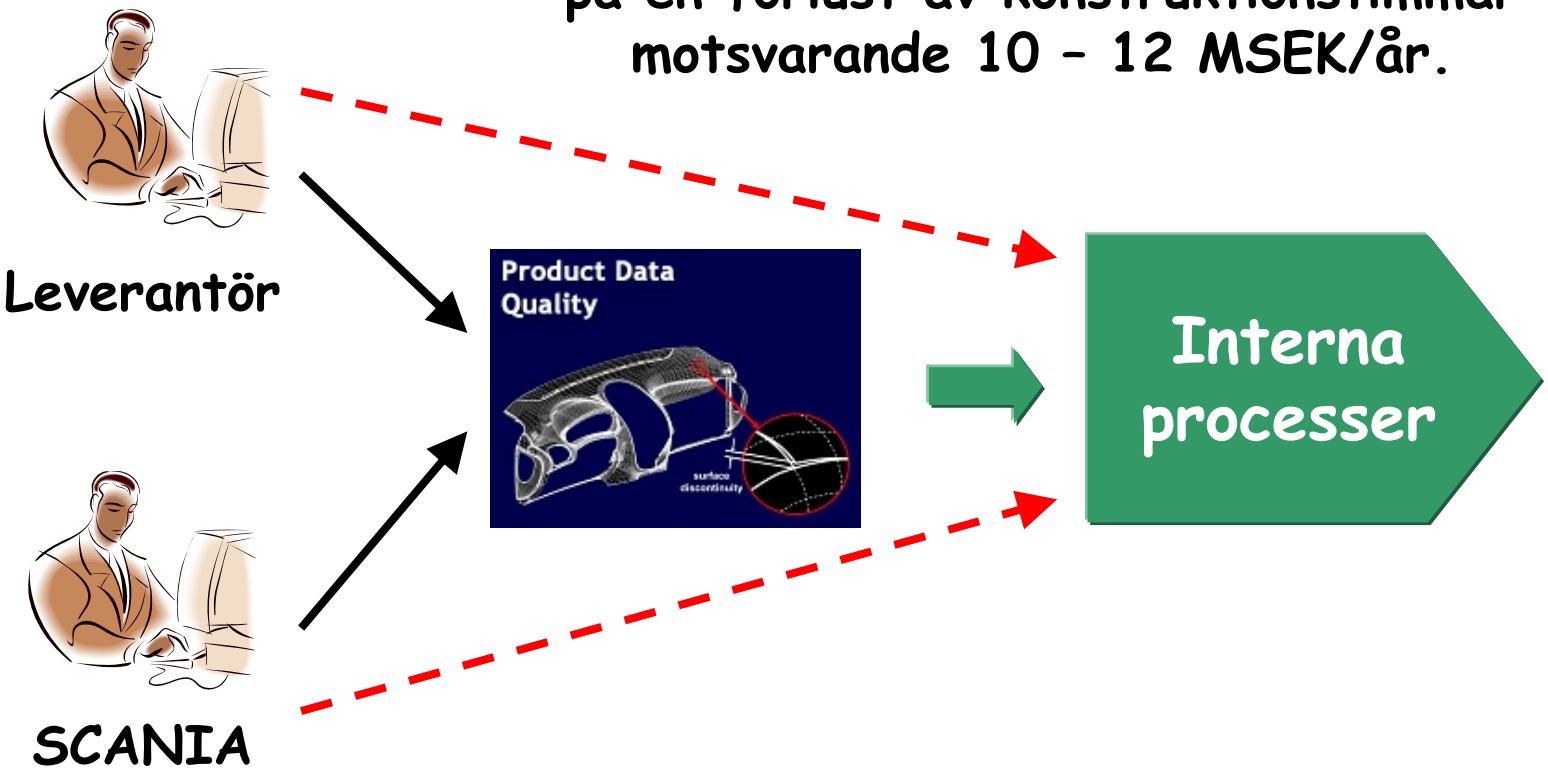
*För att se definition läs PDQ
http://www.odette.se/standarder_och_rekommendationer_sasig.asp

Example of benefits

- **The same definition of standard on all companies**
- **Suppliers will understand the definition easier**
- **All the companies can reduce there documentation in standards**
- **Reduce internal work with heeling cad-models**
- **Possibility to reduce supplier costs**

Vinster med PDQ

Interna beräkningar på SCANIA pekar på en förlust av konstruktionstimmar motsvarande 10 – 12 MSEK/år.



Nästa steg inom PDQ?