



smiths interconnect
bringing technology to life

Smiths interconnect Customer claim n° : SHYF claim n° : C14924

PASCO Laurent / 09_11_2018 / Quality

- Internal 8D
- External 8D

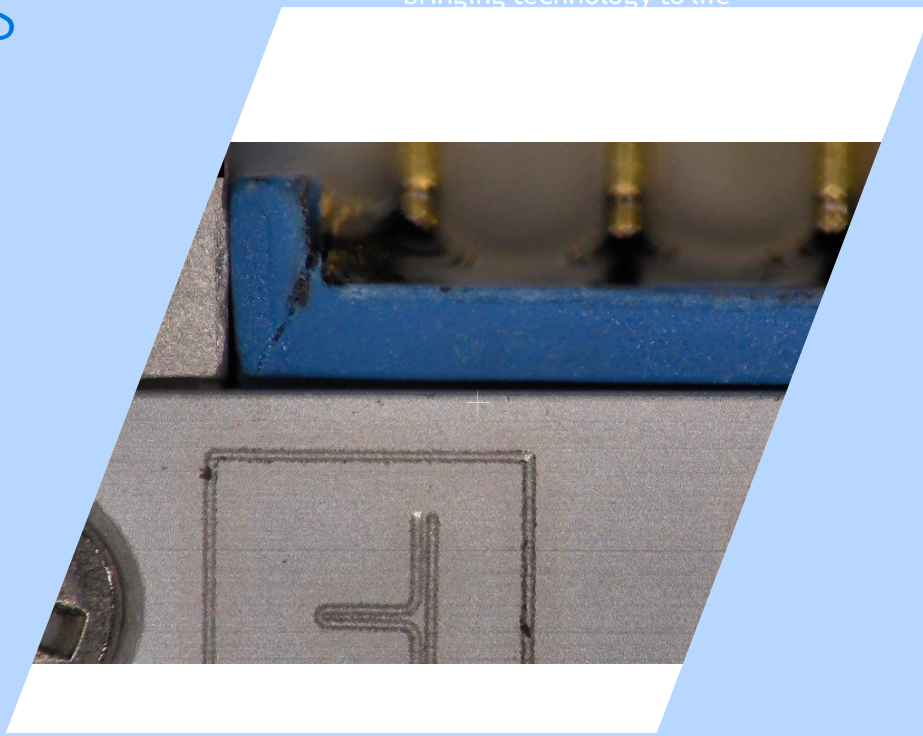


LORCH



Table of Contents

smiths interconnect
bringing technology to life



1. Define the team
2. Describe the problem
3. Implement containment actions
4. Root cause analysis
5. Implement corrective actions
6. Measure effectiveness of the actions
7. Prevent recurrence
8. Congratulate the team

Smiths interconnect 8D Form

D1 : Define the team

Team members :

Name	Function
Lyazide OUDJOURDI	Quality Manager
Laurent PASCO	Quality Engineer
Sophie BAYEZ	Incoming Inspector Former Molding Inspector Manager at SINT France
David GANDOSSO	Former Molding Technical Manager at SINT France
Jean-Sébastien LEFRILEUX	Design Office Manager
Steven BOIVIN	Engineering Department Manager

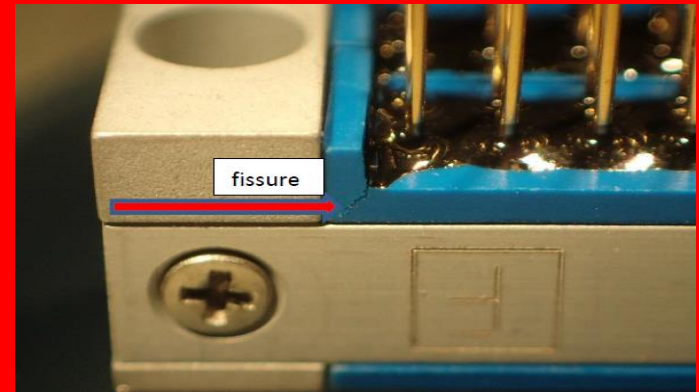
Smith interconnect 8D Form

D2 : Describe the problem : cracks on the insulator 57976-00 :

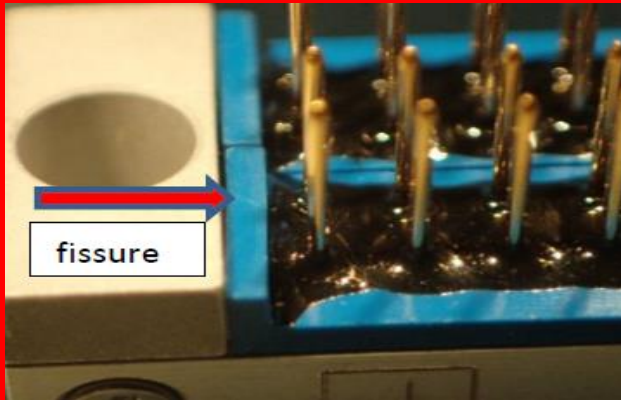
Global View :



Side view :



Top View :

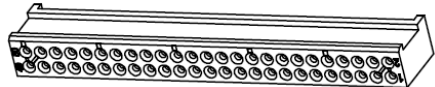




- The cracks is always located at near the pin number one.
- Mainly seen on the side ;
- Some cracks can be also seen on the top of the insulator (on the same location).

Smith interconnect 8D Form

D2 : Describe the problem

Problem Statement: Cracks on the female Insulators

Problem Description		IS	Logically could be but IS NOT	Get Information
WHAT	What Object	Insulator of receptacle MHD : 26 & 50 contacts.	1- Insulator of Plug MHD : 26 & 50 contacts. 2- Insulator of the receptacle MDD	Concerned Insulator 3D view : 
	What Defect	A crack can be detected on the insulator assembled in its mechanical Frame.	No crack was detected / claimed on the : 1- Male insulators, and 2-The receptacle MDD.	MHD Male Insulator 3D view : 
WHERE	Where on object	On the corner of the Female Insulators.	No Ending edges on the male insulator and on the receptacle MDD.	MDD Female Insulator 3D view : 
	Where first observed	Astrium Crisa	By SINT during final inspection.	
	Where seen since	By the inspectors and Astrium Crisa	By SINT during final inspection and on the naked insulators.	
WHEN	When first observed	DateCode : 0822	Not reported before 2008.	
	What is the pattern?	Regularly between 2008 and last deliveries in 2018,		
HOW BIG	How many affected	Between 1 part on 6 delivered and 5 NC on 200 delivered.		
	What size	Roughly 1 to 2 mm		
	Defects per object	Found until 2 cracks on the last return RMA 3525		

Smith interconnect 8D Form

D3 : Implement Containment action on the supply chain 12-11-18

Verification action	Part number	Localization	Where	Who	Qty	Qty Not Conform	Start	End	Duration
		Supplier							
		Transit from supplier							
		Reception							
		Incoming Inspection							
	057976-00KL	Logistic storage	SCT	H ASSIDI	292				
		Sub component							
	MHD0504430500	Work in progress	02-MAG2	M VERDURE	73	11 suscpicious	12/11/18	12/11/18	1
	057976-00KL	Quanrantine	MRB	D LACHENY	20				
		Rejects							
		Finished goods							
	All MHD receptacles	Finished goods at Logistic Storage			0		12/11/18	12/11/18	1
		Finished goods In transit							
	All MHD receptacles	Finished goods at Customers	AIRBUS						

Smith interconnect 8D Form

D3 : Implement Containment action on affected parts : list of cases claimed 24-07-19 :

Customer	Type	Lot	DC	Lot size	With Cracks	Supplier
AIRBUS	MHD1004630122	274422	822	200	5	Internal molding (Before transfert).
AIRBUS	MHD2004630122	Lot not found	928	30	2	
AIRBUS	MHD2004630122	320133	1001	6	1	Internal molding
AIRBUS	MHD1004630122	320137	1003	23	2	Internal molding
AIRBUS	MHD1004630122	333998	1026	39	3	Internal molding
AIRBUS	MHD2524630122	375661	1218A	10	1	Internal molding
AIRBUS	MHD2004630122	375660	1219	31	1	Internal molding
AIRBUS	MHD2524630122	427528	1443	10	1	REMIPLAST
AIRBUS	MHD3004630122	431063	1501	16	1	REMIPLAST
AIRBUS	MHD1004430122	472914	1620	19	1	Both suppliers
AIRBUS	MHD2004430122	468639	1627	35	1	MSI
AIRBUS	MHD3004430122	474261	1646	18	6	MSI
THALES	MHD2004631122	479097	1651A	5	3	Both suppliers
THALES	MHD3004630122	479099	1703A	5	1	Both suppliers
AIRBUS	MHD3004430122	Lot not found	1705	16	2	
THALES	MHD1524631122	500100	1744A	10	1	REMIPLAST
AIRBUS	MHD1004430122	500245	1750A	65	1	REMIPLAST
AIRBUS	MHD2004430122	501203	1751A	44	2	REMIPLAST
AIRBUS	MHD2524430122	501204	1751A	9	1	REMIPLAST
AIRBUS	MHD1524430122	501202	1751A	33	1	REMIPLAST
AIRBUS	MHD2004491	500234	1803A	67	1	REMIPLAST
AIRBUS	MHD1004430122	509703	1830A	250	5	MSI
AIRBUS	MHD1524430122	515943	1842A	14	2	MSI
AIRBUS	MHD3004491	F524562	1911A	5	1	MSI
AIRBUS	MHD1004430122	F525849	1912A	5	1	MSI
Total Cracked					47	
Total claim					25	

Smith interconnect 8D Form

D3 : Implement Containment action :

Overview of the cracks issue Vs MHD historic :

- 1rst shipment of MHD connectors : 1994
- 1rst ESA qualification : 1996
- 1rst case of MHD cracked found by EADS ASTRIUM CRISA : 2008.
- Detail of the shipments Vs cracks claimed since 2008 :

Customer	Total Qty shipped	Nb of shipment	% of claimed Vs delivered	% of claims Vs lines delivered
Other customers	51898	1782	0,00%	0,00%
EADS CRISA	3913	163	1,07%	13,50%
TAS	1011	98	0,49%	3,06%
Total	56822	2043	0,08%	1,22%

1. The crack on the part doesn't join 2 holes / contacts which means there won't be any functional concerns due to that.
2. No FOD (Object Debris) was found after vibration and VRT tests on 3 pieces returned with a crack issue : see Test Report 334413

Conclusion : no risk after implementation of such cracked connector was raised.

Smiths interconnect 8D Form

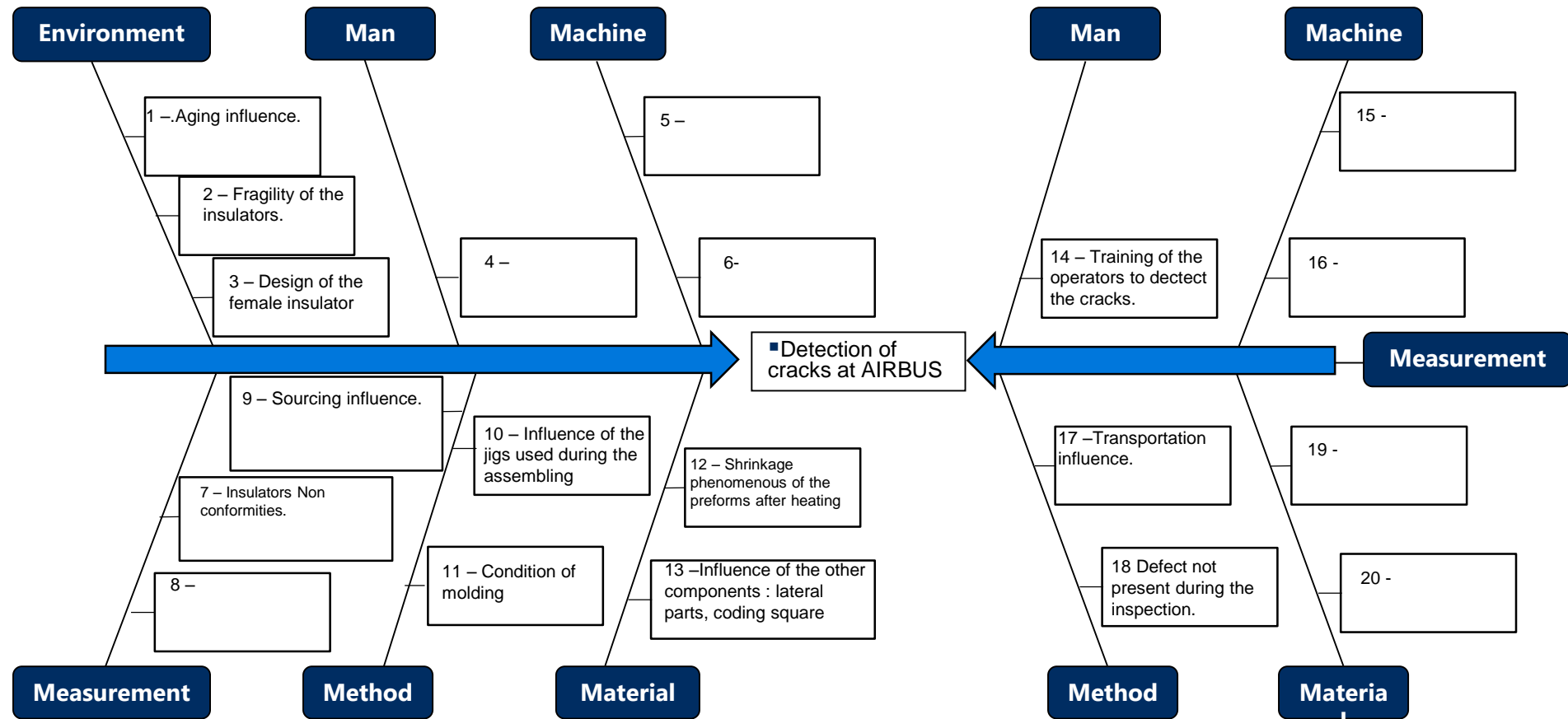
D4 : Root cause analysis / FishBone

« Occurrence »

How was it made ? / Comment a-t-on créé?

« Detection »

Why was it not detected ? / Pourquoi n'a t-on pas détecté ?



Smiths interconnect 8D Form

D4 : Root cause analysis / Action Plan

ISHIKAWA - ACTIONS PLAN : CAUSE - EFFECT

N° from Ishikawa	Root Cause	Details	Reproducibility of the failure <i>Reproduction du défaut</i>		Document Ref	Who	Due date	Start date	End date	Major	Minor	Not retained
			Test	Results Remarks <i>Resultats – Rmq</i>	<i>Réf du document</i>	<i>Qui</i>	<i>Date prévue</i>	<i>Début de l'action</i>	<i>Fin de l'action</i>			
1-	Aging influence	Time & storage condition.	Aging test cycle to see if a crack could occur. No cracks detected after the VRT test.	The last claim was about 1- Insulator moulded in last Febuary and July. 2- Module in October.		L PASCO D LARCHEVE QUE	18-07-17		18-07-17			X
2-	Fragility of the insulators.	weakness at this area of the insulator.	1- Drop test on 10 pieces issued of the 2 lots stored. 2- Porosity inside the raw material ? 3- weakness at this area of the insulator.	1- Start of crack on 1 piece but on the top of the ending and not on the side. 2- No porosity detected on this side on the 4 pieces cut. 3- 99% of the cracks are sit on the blowholes side.		L PASCO S BAYEZ	15-03-18 14-03-18 08-03-18		15-03-18 14-03-18 08-03-18	X		
3-	Design of the female insulator.	Design with a weakness on the Ending edges.	1-Comparison between the manufacturing process of a male and a female connector. 2- Comparison with a MDD female insulator.	1-No difference of manufacturing (molding, step of assembling...) between these 2 pieces. 2- No ending edges on the MHD male and on the MDD Female.	See « is / is not » page 5.	L PASCO	23-03-18		23-03-18	X		
7-	Insulators Non conformities.	Differents NC were found with the 2 supplying sources.	Check Ø of the holes and arrow effect.	No shrinkage was detected on the blowholes side and no arrow effect (insulators stored and pieces returned).		L PASCO S BAYEZ	22-03-18 17-04-18		22-03-18 17-04-18			X

Smiths interconnect 8D Form

D4 : Root cause analysis / Action Plan

ISHIKAWA - ACTIONS PLAN : CAUSE - EFFECT

N° from Ishikawa	Root Cause	Details	Reproducibility of the failure <i>Reproduction du défaut</i>		Document Ref	Who	Due date	Start date	End date	Major	Minor	Not retained
			Test	Results Remarks <i>Resultats – Rmq</i>	<i>Réf du document</i>	<i>Qui</i>	<i>Date prévue</i>	<i>Début de l'action</i>	<i>Fin de l'action</i>			
7	Insulators Non conformities.	Differents NC were found with the 2 supplying sources.	2- In 2017, Some misalignments between the slide block and the mold has been stopped. 3. Influence of the molding print.	2- Assembling test : No crack found during the assembling test. 3- All the prints are concerned.		L PASCO S BAYEZ	30-06-17 22-03-18		30-06-17 22-03-18			X
9-	Sourcing influence			All the suppliers (and Molds) are concerned		L PASCO	16-06-17		16-06-17			X
10-	Influence of the jigs used during the assembling			The assembling process (Jigs...) was reviewed : no stress on the critical spot of the insulator was seen during the assessment.		L PASCO	30-06-17		30-06-17			X
11-	Condition of molding	1- T° of baking; 2- Quality of the raw material. 3- T° of molding	3- DSC (Differential Scanning Calorimetry) analysis	1- It seems the raw material is not baked enough on some failed insulators.. But not all the concerned ones. 2- CoC from MSI checked and compliant. 3- Comparative results with male insulator showed female sample was insufficiently cured.	3- Report No 18_2045	L PASCO	12-07-17 18-07-17 20-01-19		12-07-17 18/07-17 20-01-19	X		
12-	Shrinkage phenomenous of the preforms after heating		VRT test – 5 cycles.	No cracks detected.		L PASCO	18-07-17		18-07-17			X

Smith interconnect 8D Form

D4 : Root cause analysis / Action Plan

ISHIKAWA - ACTIONS PLAN : CAUSE - EFFECT

N° from Ishikawa	Root Cause	Details	Reproducibility of the failure <i>Reproduction du défaut</i>		Document Ref	Who	Due date	Start date	End date	Major	Minor	Not retained
			Test	Results Remarks <i>Resultats – Rmq</i>	<i>Réf du document</i>	<i>Qui</i>	<i>Date prévue</i>	<i>Début de l'action</i>	<i>Fin de l'action</i>			
13-	Influence of the mechanical part.	Sometime the operator would met some difficulties to insert the modules.	1- Analysis of pieces returned 2- Change the position of the insulator in a connector to check if a save module could have a crack if placed in the same position than a failed one.	1-Pieces returned with cracks were confirmed without any constrain inside the mechanical part. 2- No further crack.		L PASCO	18-04-18 05-07-17		18-04-18 05-07-17			X
14-	Training of the operators to dectect the cracks	Prevent customer from delivering new crack issue.	Improvement of the training of the operators : set of an alert form.		Alert Form number AI- 03-17-01	S GONDE	01-03-17		01-03-17			X
17-	Transportation influence.	Defined a vibration test.	1- Vibration test on save modules to see if the vibration can generate a crack. 2- Vibration test on modules already cracked to see if the vibrations can increase the crack.	1- No occurrence of crack. 2- No degradation of the crack.	1- Test report no : 334409 1- Test report no : 334413	L PASCO S LEROY	16-11-18		19/03/19 25/06/19			X
18-	Defect not present during the inspection.		Inspect the 73 insulators issued of the lot concerned.	No crack detected at X10.		L PASCO M VERDURE	16-11-18		16-11-18		X	

Smith interconnect 8D Form

D5 : implement corrective actions

Nr	CAUSES	ACTIONS	WHO QUI	DUE DATE DELAI	P	D	C	A
2	Fragility of the insulators : weakness on the blowhole side due to insufficient cleaning.	1- Confirm the implementation of the Working instruction at AMS : audit to be launched. 2- Implement the same Working instruction at the other supplier (MSI).	D GANDOSSO L PASCO L OUDJOUDI B STULL	1- 31/08/19 2- 31/08/19		X	X	
3	Design of the female insulator : comparison with the MHD male insulator and the MDD female insulator.	A design improvement was proposed = removal of the ending edge. This one was designed to retain the epoxy when it was a liquid process. It was kept after implementation of the preforms.	L PASCO JS LEFRILEUX S BOIVIN L OUDJOUDI	26/10/19		X		
11	T° of molding and time of curing	Our Supplier MSI carried out an Experimental plan with variation of the curing times and Temperatures. 1- Results : Best configuration were found at the lowest T° advised on the data sheet of the raw material. No possible action on the process. 2- Remaining actions : Safety stock before mold modification with 100% check at MSI : 10000 insulators.	L PASCO JS LEFRILEUX MSI	1- 18/06/19 2- 23/08/19		X		

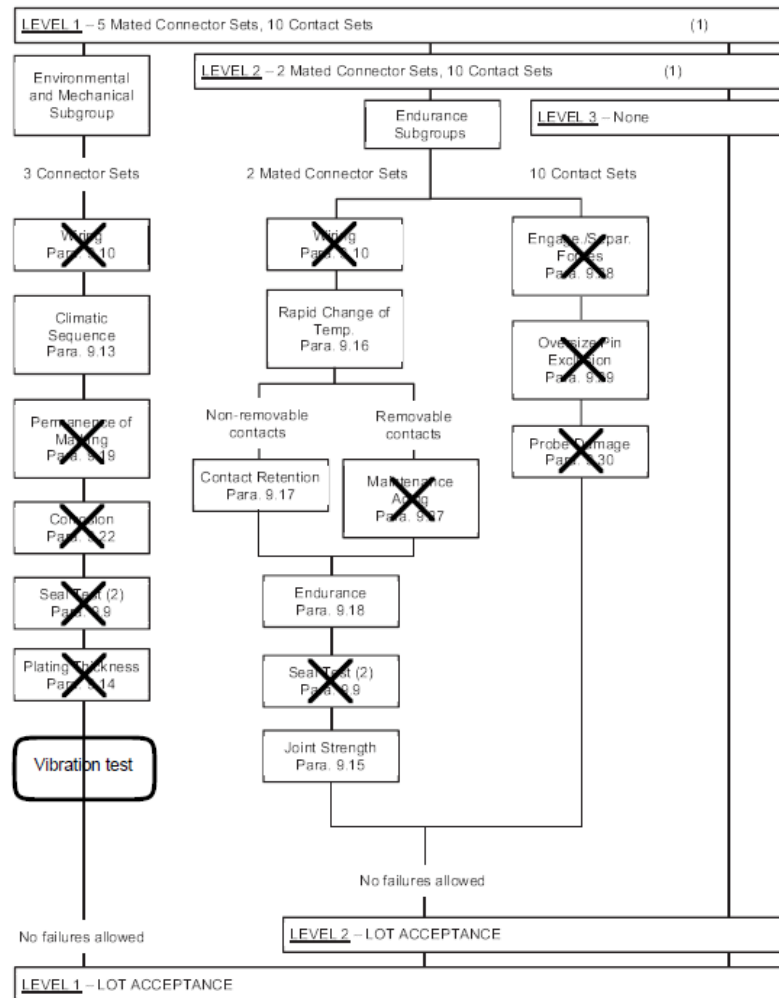
Smith interconnect 8D Form

D5 : implement corrective actions

Actions	Planning of the implementation of the new Female insulator :																						
	W26	W27	W28	W29	W30	W31	W32	W33	W34	W35	W36	W37	W38	W39	W40	W41	W42	W43	W44	W45	W46	W47	
Opening of a Change Request (PDM No 90-00-723)																							
Capability study of the bending following the new process with samples machined.																							
Provide the green light to MSI to modify their mold (removal of the ending edges) on the 57976 (Modules 50 contacts).																							
Manufacturing of a last batch of 10000 insulators with the current design to prevent from supply chain breaking.																							
Modification of the drawings (removal of the ending edges) of the 57976 (Modules 50 contacts) and 58164 (modules 26 contacts).																							
Modification of the mold (removal of the ending edges) of the 57976 (Modules 50 contacts).																							
Molding of 1st prototypes (Design reviewed).																							
FAI of the new insulators + capability Study																							
Shipment of the pieces																							
Inspection by SINT of the 1st prototypes.																							
Confirmation of the 1st bending capability study with the prototypes.																							
Carry out of a shorten LAT 1																							
Green light to MSI to start the manufacturing with the new design of insulators.																							
Continue the Change Process steps (updating of all the associated documentation : Drawing, Control plan...)																							
Ask to the other supplier AMS to stop the manufacturing and deliveries of the current design of MHD026 and MHD050 modules.																							
Provide the green light to AMS to modify their mold on the 57976 (Modules 50 contacts) and start the same procedure with the 58164 (modules 26 contacts).																							
Modification of the mold (removal of the ending edges) of the 57976 (Modules 50 contacts) and that of the 58164 (Module 26 contacts) at AMS																							
Molding of 1st prototypes (Design reviewed).																							
FAI of the new insulators + capability Study																							
Shipment of the pieces																							
Inspection by SINT of the 1st prototypes.																							
Carry out of a shorten LAT 1																							
Green light to AMS to start the manufacturing of the 2 kinds of connectors with the new design of insulators.																							
Complete the Change Process steps (updating of all the associated documentation : ESCC = DCR ...)																							
Broadcast of an information bulletin towards our customers about the removal of the ending edges.																							
Closure of the Change Request																							



CHART V.- LOT ACCEPTANCE TESTS



NOTES

1. For distribution within the sample, see Para. 8.2.2.
2. Hermetic connectors only.

Smith interconnect 8D Form

D6 : mesure effectiveness of the actions

-

Smith interconnect 8D Form

D7 : prevent recurrence

Documentation update PDCA :	Not Applicable	Applicable		
		Done	Scheduled	
			Who	When
Drawing				
Specifications book				
AMDEC / FMEA Product, Process, Components				
Master Process FMEA				
Control plan				
Working instructions				
Process Standards (Parameters...)				
Maintenance plan				
Quality Manual				
Gauges				
Statistical Process Control				
Audit plan				
Other				

Smith interconnect 8D Form

D7 : prevent recurrence

YOKOTEN PDCA	Not Applicable	Applicable		
		Done	Scheduled	
			Who	When
Others parts :				
Others lines :				
Others workshop :				
Others plants :				

We have not been able to reproduce the concerns of this claim.

The most potential cause of this concern is :

To avoid such concern in the future BENTELER recommendation is :

Smith interconnect 8D Form

D8 : assessment before closure

Assessment date:		Assessor:		8D Report Closure date:			
Plant; Department:				Q2 number:		Supplier 8D No.:	

	Category	NG	OK (minimum)	Excellent	Score
-	8D team	<input type="radio"/> (0) No 8D team definition	<input type="radio"/> (+1) 8D team defined and Quality Management participation	(+0.5) Additional Participation (e.g. Production Manager, Plant Manager, etc.)	1,5 / 1,5
D2	Problem Description	<input type="radio"/> (0) "Shallow" problem description	<input type="radio"/> (+1) OK. Understandable explanation of the failure	(+0,5) Detailed problem description, documentation of the problem (Photos, Analysis report, etc.)	1,5 / 1,5
D3	Containment actions	<input type="radio"/> (0) Not defined, poor, not clear, incorrect date	<input type="radio"/> (+1) Defined and implemented; correct date	(+0,5) All areas checked, identification realized, validated tests, other plants informed etc.	1,5 / 1,5
D4	Root Cause Analysis (non-conformance)	<input type="radio"/> (0) "Shallow" root cause or direct cause only or just hypothesis	<input type="radio"/> (+2) OK. Root cause for the non-conformance found	(+1) All possibilities confirmed (Ishikawa, 5 x why attached, Risk analysis)	3 / 3
D4	Root Cause Analysis (non-detection)	<input type="radio"/> (0) "Shallow" root cause or direct cause only or just hypothesis	<input type="radio"/> (+2) OK. Root cause for the non-detection found	(+1) All possibilities confirmed (Ishikawa, 5 x why attached, Risk analysis)	3 / 3
D5	Possible Permanent Corrective Actions and Verification	<input type="radio"/> (0) No verification	<input type="radio"/> (+1,5) OK. Effective, timing included and achieved	(+0.5) Documentation of proof. Verification is statistical significant	2 / 2
D6	Introduced Corrective Actions and Verification	<input type="radio"/> (0) Poor, not clear, not robust, no timings, no evidence of physical action	<input type="radio"/> (+4) OK. Effective countermeasure. Includes timing and responsible person	(+1) Verification is statistical significant	5 / 5
D7	Preventive Actions to Avoid Recurrence	<input type="radio"/> (0) Blank	<input type="radio"/> (+1,5) Defined Actions (PQP, QAM, FMEA etc.)	(+1) Communication to potentially affected departments, Lessons Learned etc.	2,5 / 2,5

O = Overall excellent

Δ = Okay/Average

X = Not sufficient

Total Score D5	12,5	/ 12,5	Total Score D7	20	/ 20
Percentage	O	100,0%	Percentage	O	100,0%

Smith interconnect 8D Form

D8 : Congratulate the team

- **What did we learn from this problem?**

- **How did we share?**

- **Celebrate?**

Closed by	
Date	

Smiths interconnect 8D Form

Annex 1 : Internal information flash

Smiths interconnect 8D Form

Annex 3 : Product description

Smiths interconnect 8D Form

Annex 4 : Process description and flow chart

Smiths interconnect 8D Form

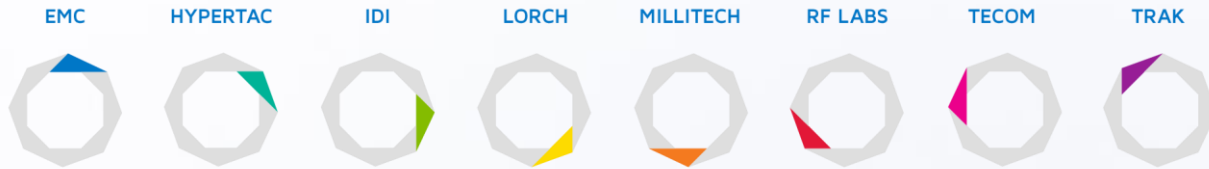
Annex 4 : Process description / PFMEA Extract

Smiths interconnect 8D Form

Annex 4 : Process description / Control Plan



smiths interconnect
bringing technology to life



[more > smithsinterconnect.com](#)