



SAPPPMA

southern african plastic pipe manufacturers association



WEBINAR I

February 2021

25-02-2021

SAPPMA Quality Workshops I-V on SAPPMA Web site

SAPPMA Quality Workshop

Introducing ISO/IEC 17067:2013

Conformity assessment: Fundamentals of product certification with a certification scheme

advanced laboratory SOLUTIONS Co-presented by Reza Theunissen Product Specialists, Instron and TA

10-04-2019

SAPPMA Quality Workshop III

presented by: IFPA

IFFPA SAPPMA

SAPPMA Quality Workshop V Key Messages

ISO 9001:2015 CERTIFIED

Co-presented by: Alaster Goyns Jacques Van Eck Renier Snyman

22-10-2020

SAPPMA Quality Workshop II

Co-presented by Justin Marsberg and Francois Prinsloo

17-07-2019

P.E.S.C. Polymer and Plastics Testing Laboratory SAPPMA

SAPPMA Quality Workshop IV

Co-presented by: Vullie Brink Albert Vaartjes Alaster Goyns Johann Wessels

22-07-2020

SAPPMA





SAPPM

southern african plastic pipe manufacturers association

Your feedback after
each session drives the
change

Thank You

25-02-2021

WEBINAR I

February 2021

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3

Unraveling the Puzzle

PROBLEM

SOLUTION

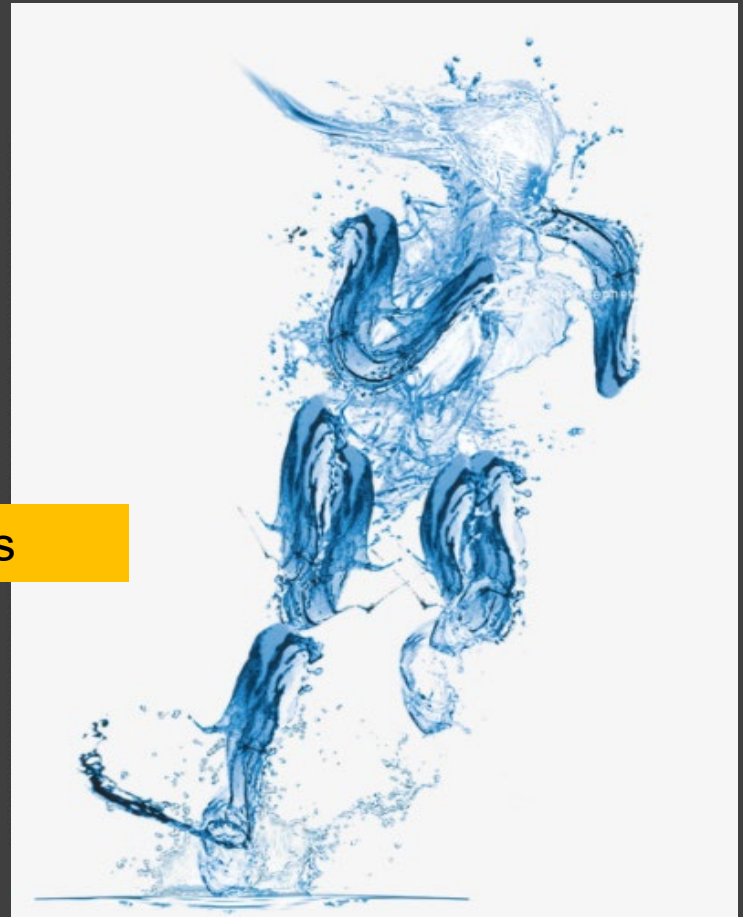
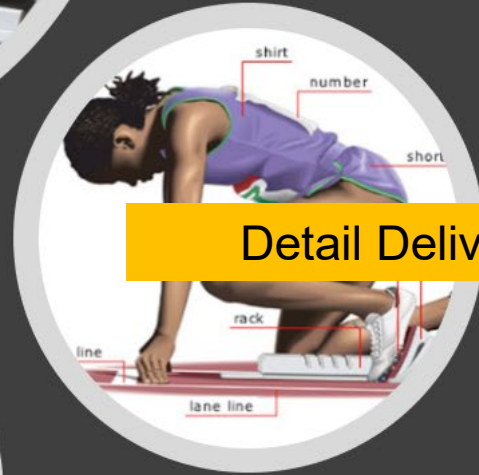


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Where do you start, and end?



Where do you go if it has gone wrong?



IFFA

INSTALLATION AND FABRICATION PLASTICS
PIPE ASSOCIATION

a **SAPPMA** initiative
southern african plastic pipe manufacturers association



CODE OF CONDUCT

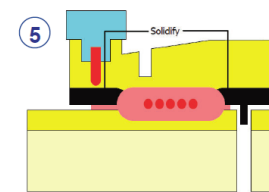
Preamble

IFPA (Installation and Fabrication Plastic Pipe Association) is a voluntary association and an affiliate of SAPPMA, which is incorporated under the laws of South Africa as a Section 21 Company. IFPA represents plastics pipe Installers and Fabricators.

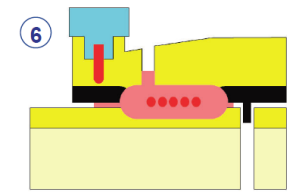
The members of IFPA agree to bind themselves to a code of conduct and policies which will demonstrate their commitment to lawful business practices, free and fair competition and compliance with competition and environmental laws, rules and regulations as well as the production and marketing of highest conforming quality

The process inside an electrofusion fitting

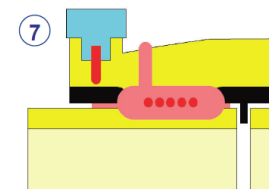
Cold zone PE solidifies



Weld indicators push up



Fusion Cycle End



Remember
Good fusion requires
temperature, time and
pressure

P/Bag X68
Halfway House
1685

18 Gazelle Ave
Corporate Park
Midrand

www.ifpa.co.za
admin@ifpa.co.za

011 314 4021



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southern african plastic pipe manufacturers association

25-02-2021

IFPA (Installation and Fabrication Pipes Association) Consulting Engineer's Contract Document

This document is intended for use by Consulting Engineer's in compiling their RFQ and Contract Documentation for works that include the welding of thermoplastic systems

IFPA Membership

Preference shall be given to IFPA Member Companies in good standing. Welders employed by IFPA Member Companies are issued with welders' certificates and a unique weld identity stamp that provides traceability for each weld.

IFPA Members

The welding equipment and processes shall comply with the applicable SANS (South African National Standard) for the welding operation as follows:

- The SANS 1671 "series" of standards specifies the requirements for conformance of machines and equipment; for example, SANS 1671-1 Part 1: *Heated tool welding*.
- The SANS 10268 "series" of standards specifies the requirements for conformance of welding processes; for example, SANS 10268-1 Part 1: *Heated tool welding*.
- The SANS 1671 and 10268 "series" of standards specify the requirements for conformance of machines and equipment, and processes respectively for:
 - -1 Heated tool welding (Butt welding)
 - -2 Electro-fusion welding
 - -3 Hot gas welding
 - -4 Hot gas extrusion welding
 - -5 Solvent welding
 - -6 Ultrasonic welding, stacking and insertion
- SANS 10270 Welding of thermoplastics – Approval of welding procedures and welds.

IFPA Members shall have copies of the above SANS Standards and the relevant product standards, have a full understanding of the content and implementation thereof.

Approval

Before work commences the contractor shall be required to obtain approval by conforming to the following:

- SANS 10269 Welding of thermoplastics – Testing and approval of welders
- SANS 10269 Plastics welder Test Piece Certificate
- SANS 10270 Welding of thermoplastics – Approval of welding procedures and welds.

They shall be conducted, for a particular machine or equipment, for a range of pipe diameters as follows:

- small (<160 mm)
- medium (160 – 315 mm)
- large (>315 mm) and.

SANS 10268 continuous visual inspections and recording of each weld during and upon completion.

SANS 10268 & 10270 Recording of process conditions on site as well as all critical process parameters as per the approved welding procedure.

The process of each approval is witnessed by a qualified welding inspector (Plastics) SA Certificate of Competence "Thermoplastic Welding Inspection" or AIA Approved Inspection Authority with a thermoplastic welding qualification) who documents conformance on completion, records the approval and certifies it.

Supporting approval documentation

Non-destructive visual assessment of the weld shall be conducted in accordance with the following:

- SANS 10268-10 Welding of thermoplastics – Welding processes Part 10: Weld defects.

Destructive testing of the weld shall be conducted in accordance with the following: Weld Qualification (Competence)

- SANS 6269 Welding of thermoplastics – Test methods for welded joints.

System weld (performance)

- Pipe System standard
- System designed weld factor

QC/QA on site

SANS ISO 4427 - Compliance of all components to the appropriate standard and contract requirements will be validated and recorded.

Confirm that component supplier is a valid SAPPMA member www.SAPPMA.co.za

Confirm that the fabricator welder is a valid IFPA member www.IFPA.co.za

Confirm that the Testing and Approval certificate of the welder is still valid www.Plasticsinfo.co.za

No welding inline of unmarked non-traceable non-conforming product (Components) will be done.

During the construction of the works, the "last weld" shall be "cut-out", on a random basis, from the pipeline for visual inspection and destructive testing at a sampling rate as follows:

- 0 – 250 welds 5%
- 250 – 500 welds 3%
- 500 – 1200 welds 2%
- 1200 – 3200 welds 1%
- 3200 – 10000 welds 0,5%

The contractor shall allow for this sampling rate in their tender and in the construction program for the works.

Designing of a different sampling plan.

Refer to SANS 2859-1 Sampling procedures for inspection by attributes Part 1 and specify your requirements.



Welding Machine Inspection

Company: _____
 Contact: _____
 Date: _____

Butt Welding Machine

Manufacturer: _____ Serial #: _____
 Type: _____ Year: _____
 Low / Med / High Pressure: _____ Manual / Semi / Auto: _____

Quality Requirements

Markings

- Manufacturers Name
- Type of Machine
- Year of Manufacture
- Safety Warnings

Comments	Acceptable	
	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
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Frame

- Appearance - corrosion, etc.
- Hydraulics - leaks, etc.
- Clamps - complete, nuts, 80 %, sharp edges, circular etc.
- Inserts - complete, 80 %, sharp edges, circular, etc.
- Stub Holder
- Rigidity and alignment
- Opening stroke and daylight area
- Lubrication System
- Handling Devices - handles, eye bolts, etc.
- Anchoring

Comments	Yes		No	
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Hydraulic Unit:

- Appearance
- Oil Leaks
- Hoses
- Pressure regulator - SANS 2503
- Pressure Gauge - SANS 1062
- Pressure control requirements - max pressure, equalization, reserve, etc.
- Hydraulic Oil
- Electrical / Electronics - SANS 60335-2-45, SANS 60669-2-1 and SANS 214-1 where applicable
- Pressure deviations

Comments	Yes		No	
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Set Pressure	1 bar	2 bar	5 bar	10 bar	20 bar	30 bar	40 bar	50 bar
Actual Pressure								

Set Pressure	60 bar	70 bar	80 bar	90 bar	100 bar	Max pressure test
Actual Pressure						bar / minutes

- Pressure gauge Serial # _____ Calibration Report
- Timing Control

Comments	Yes		No	
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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Planer

- Appearance
- Plane-parallelism
- Blades
- Safety Switch
- Electrical / Electronics - SANS 60335-2-45, SANS 60669-2-1 and SANS 214-1 where applicable
- Handling Devices - handles, eye bolts, lifting devices, etc.
- Shaving visibility

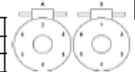
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Heated Tools:

- Appearance
- Handling Devices - handles, eye bolts, lifting devices, etc.
- Cables - thermal insulation, etc.
- Storage - protective containers
- Plane-parallelism
- Self Centring
- Bead Visibility
- Effective working area (info Plate)
- Surface coating - roughness, thickness, colour, and 1hr 260 °C test.
- Temperature deviations

Comments	Yes		No	
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Set Temp	Actual	1	2	3	4	5	6
A							
B							



- Temperature gauge Serial # _____ Calibration Report

Documentation (in English):

- Booklet with description of the functional features and machine performance specifications
- Operating instructions
- Welding Tables
- Maintenance instructions, including details of statutory safety inspections
- Servicing and calibration instructions.
- Manufacturers ISO 9001:2008 Certificate

Comments	Yes		No	
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Weld Reports

- Name of Welder
- Weld Number
- Job number or site name
- Date, time and ambient temperature
- Machine details
- Product info
- Welding parameters against recorded parameters

Comments	Yes		No	
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Other


- Personal Protective Equipment
- Protective Equipment (tent, etc)
- _____

Comments	Yes		No	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Checked: _____ Audited: _____
 Name: _____ Name: _____
 Date: _____ Date: _____

Ensure Specifications cover the whole value chain

Overview of Quality Assurance Measures in the Construction of Thermoplastic Pipelines

Type of Measure	Standards, Directives and Regulations	Preferred Application	Remarks about the Frequency
Material Tests		Manufacture of Compounds, Components and pipe Parts	Permanent with certification according to DIN EN 10204 (Types of Inspection Documents)
Incoming Tests - Semi-Finished products - welding and filler materials		Fabrication	Permanent with the obligation to keep records
Intermediate Tests - Components - Special Fittings		Fabrication	Object-Related with obligation to keep records
Final Tests Outgoing Inspections -Pipeline Parts -Assembly Devices		Fabrication, Assembly	Object-Related with obligation to keep records
Checking of Machines and Devices		Fabrication, Assembly	At least once per year with documentation
Monitoring of the fabrication and laying work		Fabrication, Assembly	Permanent with the obligation to keep Records
Internal Pressure Test/Deformation checks		Assembly	Object-Related with Documentation
Training of the supervisory personnel		Fabrication, Assembly	Annual updating by attending seminars etc.
Training of the Welding, Jointing, Adhesive bonding personnel		Fabrication, Assembly	Annual Requalification Tests
Advanced training of the Laying personnel	Courses, Seminars	Assembly	Every 12 to 6 Months

Presenters

SAPPMA Webinar I

25 February 2021



Renier Snyman



Ian Venter

SAPPMA
southern african plastic pipe manufacturers association



Basic failure analysis of Rigid Thermoplastic Materials

Determining The Root Cause

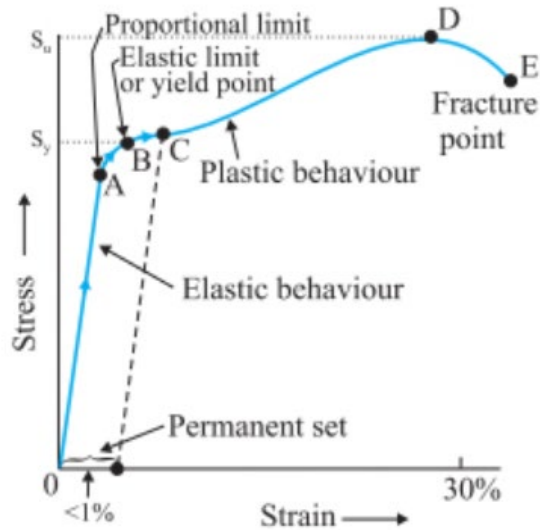
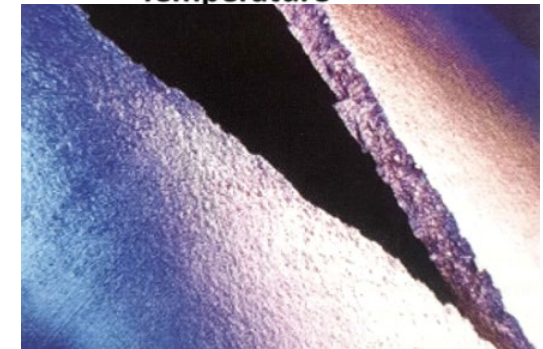
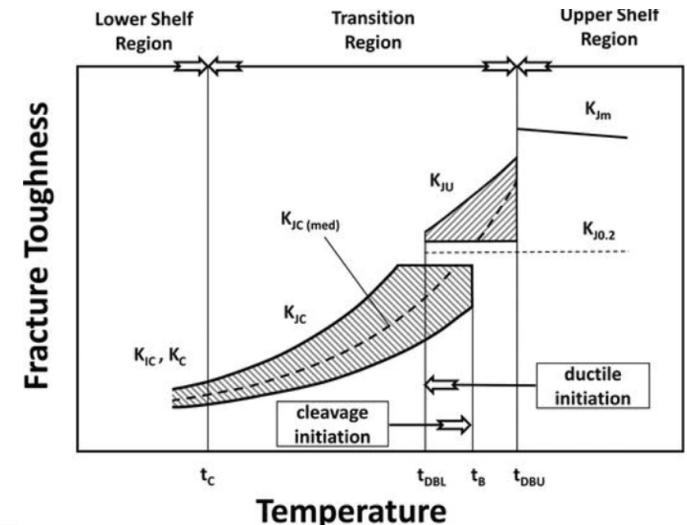
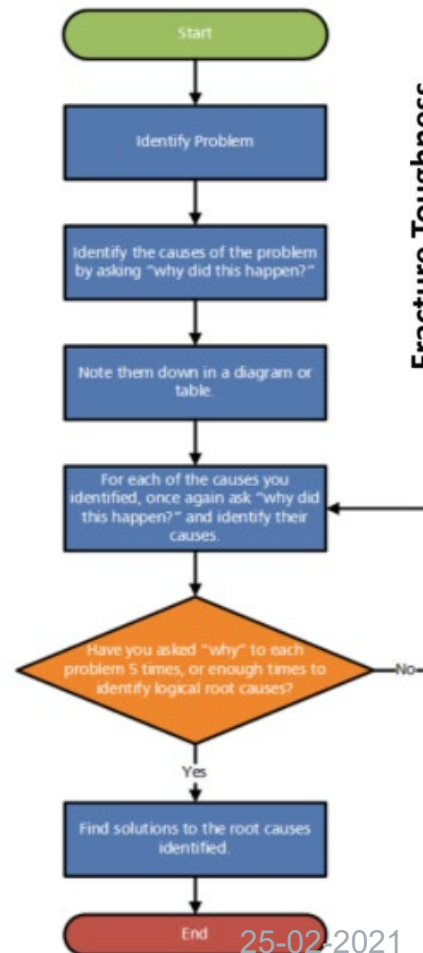


Fig. 2

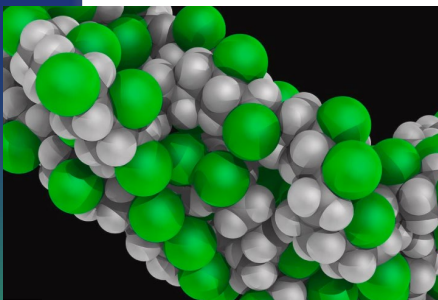
Presented by:
Renier Snyman



Sunace SA Training



Basic Failure Analysis of Rigid Materials



25/02/2021



By R. Snyman

Types of Failure

Mechanical

 Brittle


 Ductile

 Fatigue

 Creep & Stress Relaxation

Thermal

 High / Low Temperatures

 Expansion / Contraction

 Degradation

Chemical

 Chemical Attack

 ESC (Environmental stress cracking)

 Hydrolysis

Environmental

 UV Attack

 Ozone

 Oxidation

 Temperature Changes

 Acid Rain

 Humidity & Moisture

 Pollution

 Biological

Finding the Origin

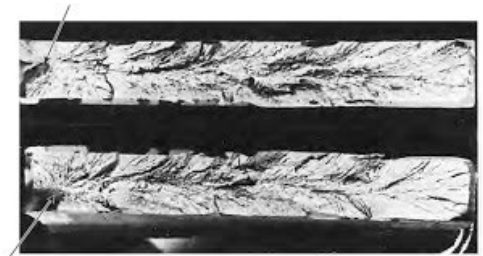
Branching

Branches point away from the origin



River Marks

River marks point to the origin



(a) Photograph showing V-shaped "chevron" markings characteristic of brittle fracture. Arrows indicate origin of crack. Approximately actual size.

Wallner Lines

Radiate away from the origin like wavebands



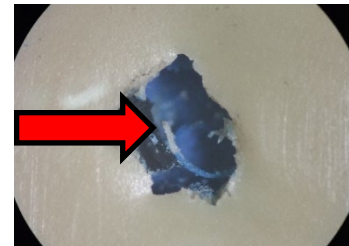
Fatigue Striations

Emanate away from the origin

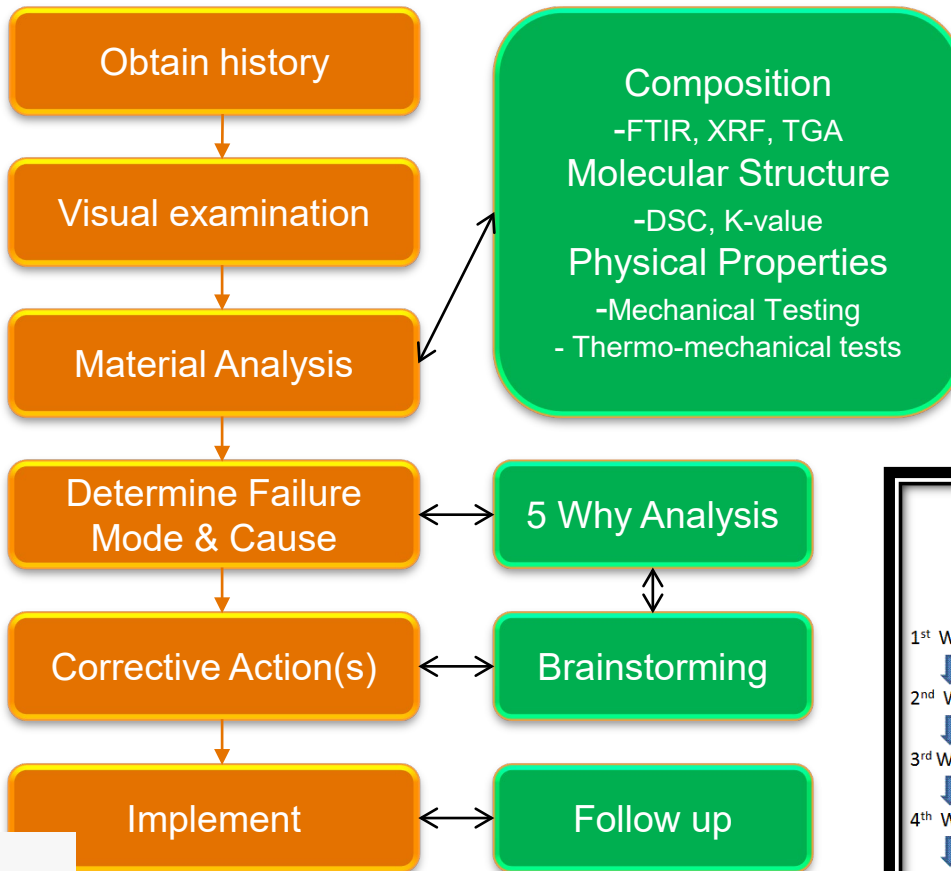


Dispersion Issues

Look for agglomerated material on the fracture edge



How to Investigate Failure



	Problem / Defect		
	Answer what caused the specific situation	Answer why the problem wasn't detected	Answer what system(s) failed
1 st WHY?	<input type="text"/>	<input type="text"/>	<input type="text"/>
↓			
2 nd WHY?	<input type="text"/>	<input type="text"/>	<input type="text"/>
↓			
3 rd WHY?	<input type="text"/>	<input type="text"/>	<input type="text"/>
↓			
4 th WHY?	<input type="text"/>	<input type="text"/>	<input type="text"/>
↓			
5 th WHY?	Should be at the root cause near 5 th question	<input type="text"/>	<input type="text"/>

5 Why's Terminology



RCA – Root Cause Analysis



Root Cause – Initiating cause of an effect of interest



Cause and effect – the relationship(s) between events, where the 1st event is responsible for the second



5 why's – An interrogative technique used as part of DMAIC (6 sigma) methodology to determine the root cause of a defect

Why use 5 Why's

- It is a very effective technique to find a root cause (or multiple root causes)
- It also determines relationships between different causes of a problem
- It is simple and quick and does not require statistical analysis, etc to use
- Can be used in brainstorming sessions and it is helpful for compiling fishbone diagrams
- 4 year old children use this technique extensively!



This Photo by Unknown Author is licensed under [CC BY-SA](#)

How to use 5 Why's

1

Write down the specific problem. Writing the issue helps you formalize the problem and describe it completely. It also helps a team focus on the same problem.

2

Ask Why the problem happens and write the answer down below the problem.

3

If the answer you just provided doesn't identify the root cause of the problem that you wrote down in Step 1, ask Why again and write that answer down.

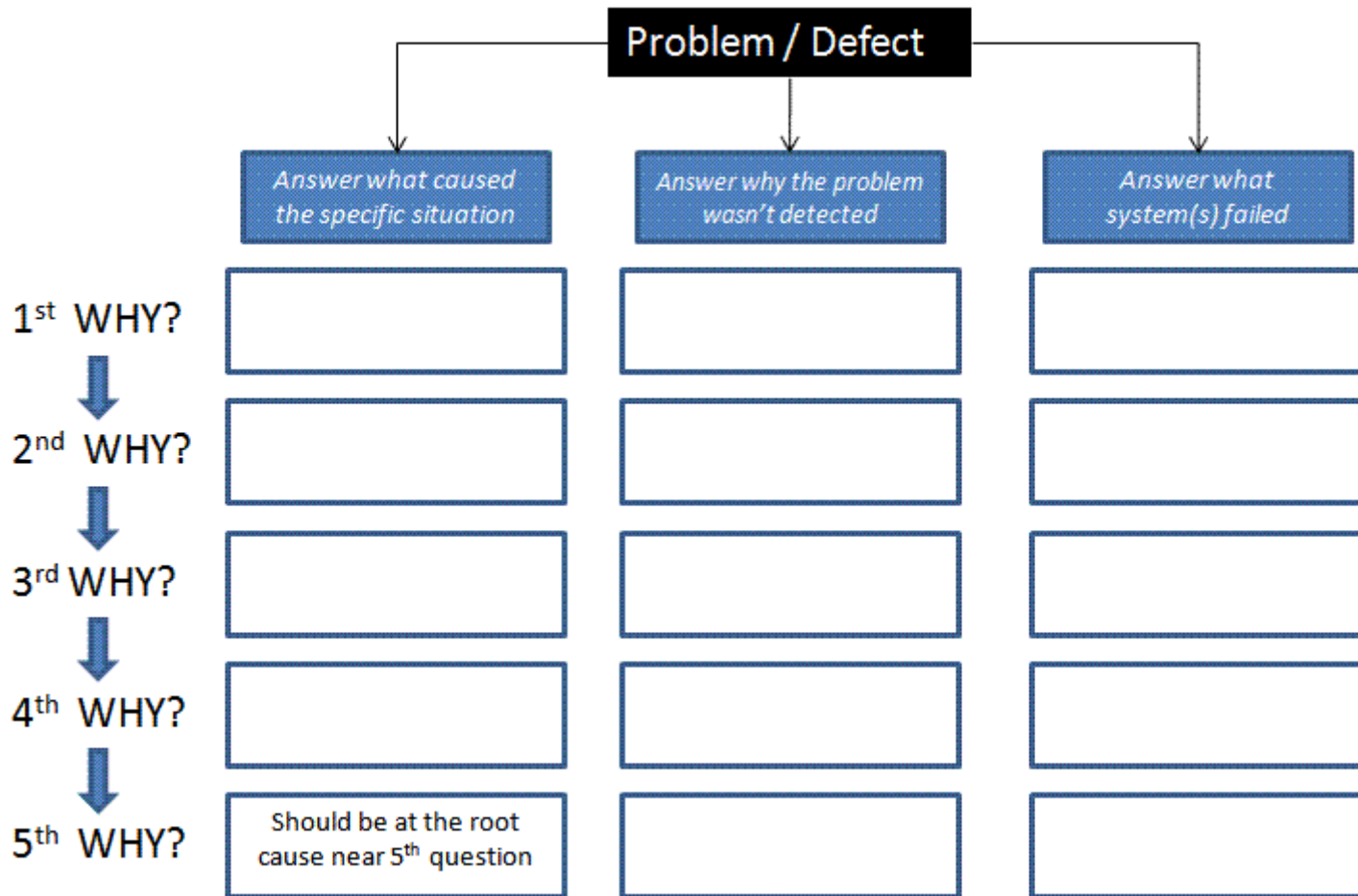
4

Loop back to step 3 until the team is in agreement that the problem's root cause is identified. Again, this may take fewer or more times than five Whys

5

Note: 5 Why's is available electronically. Programs like Shopware support it. Or you can Google "5 why's form" and download an Excel version online. It's that easy!

Use a form



Conclusion



Obtain history behind the failure



Visual examination can assist in determining the origin of a fracture



RCA techniques like 5 Why and Brainstorming are essential to determining the failure cause and corrective / preventive action(s)



Always follow up on implementation to ensure that the rectification actions are working

Site Investigation Checklist

Installation	√
Trenching done as per SANS 2001: DP2	
No rocks, sharp objects	
Soil conditions (sandy / clay)	
Jointing done correctly	
Thrust blocks in place, correct size	
Backfill and compaction	
Gradient of sewer line	
Operation	√
Pressure within all components' MOP	
Fluid velocity, water hammer counter measures	
Start up and shut down procedures	
Air valves, non-return, PR valves	

Handling	√
Offloading practise	
Stacking practise	
Storage of products	
UV protection	
Levelled ground	
Site Testing	√
Gauge units	
Equipment condition, leaks	
Test procedure / pressure as per SANS 2001:DP2	
Test pressure & time correct	
Air expelled, slow start up	
End caps thrust arrested	

Brittle Failure



Ductile Failure



Fatigue Failure



Expansion / Contraction Failure



Degradation Failure



Chemical Attack



Ultraviolet Attack



Humidity & Moisture



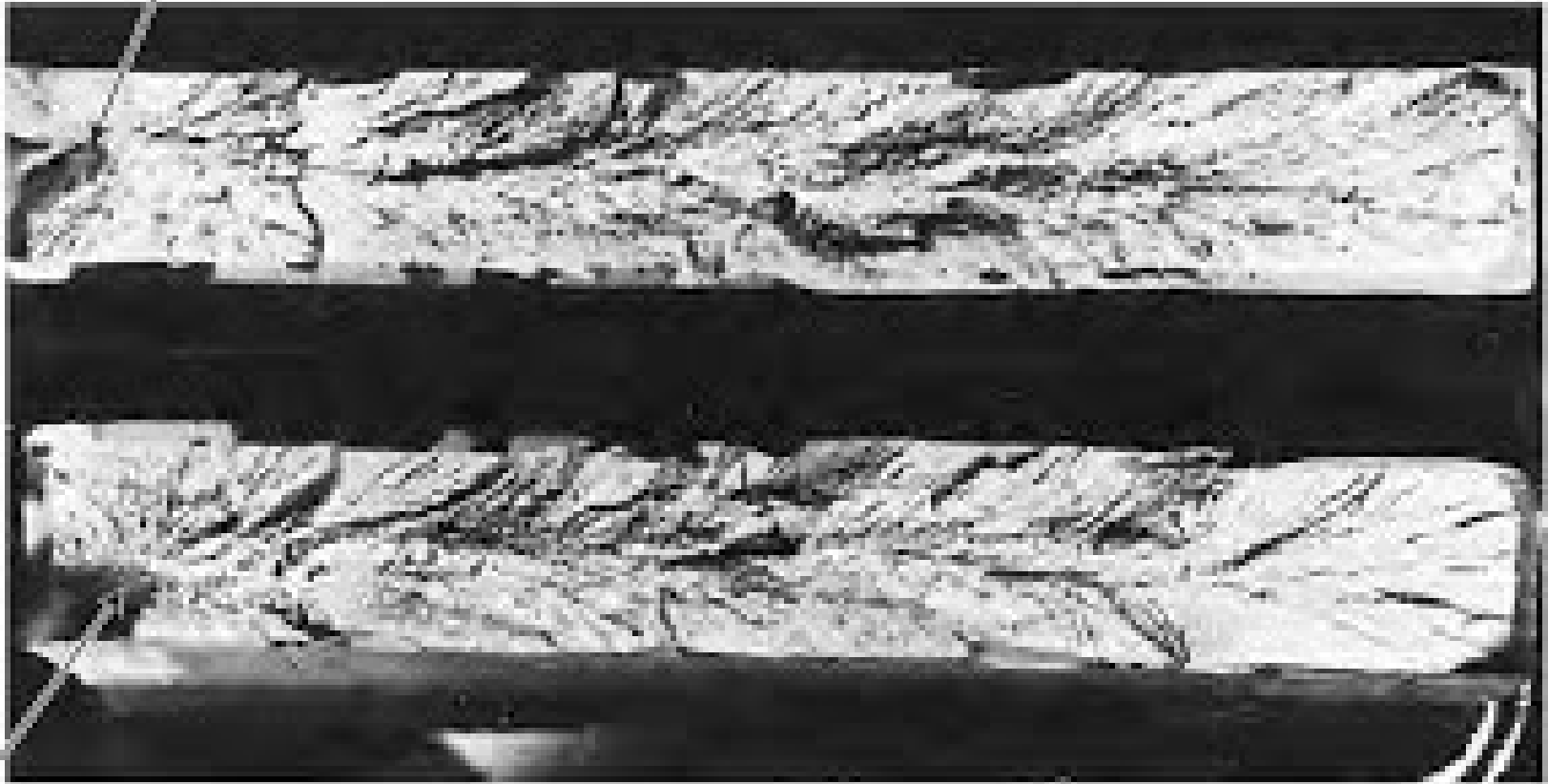
Pollution



Branching



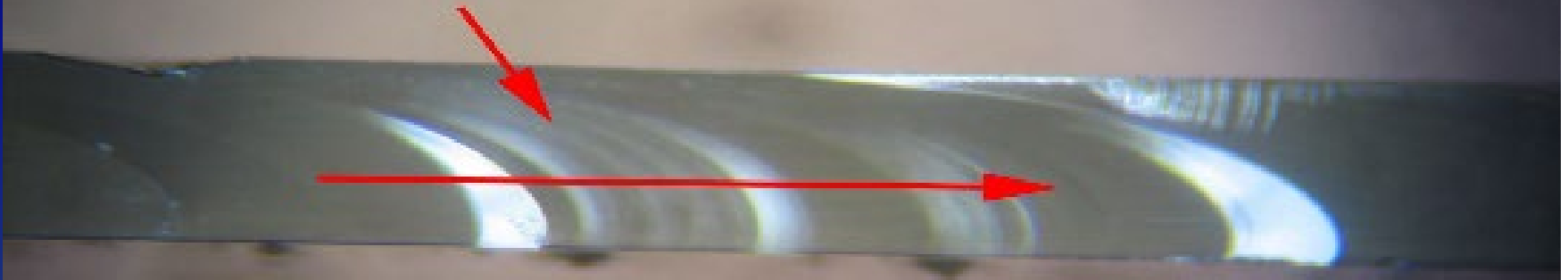
River Marks



(a) Photograph showing V-shaped "chevron" markings characteristic of brittle fracture. Arrows indicate origin of crack. Approximately actual size.

Wallner Lines

Single Set of Wallner Lines

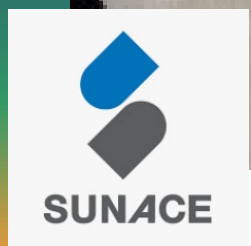
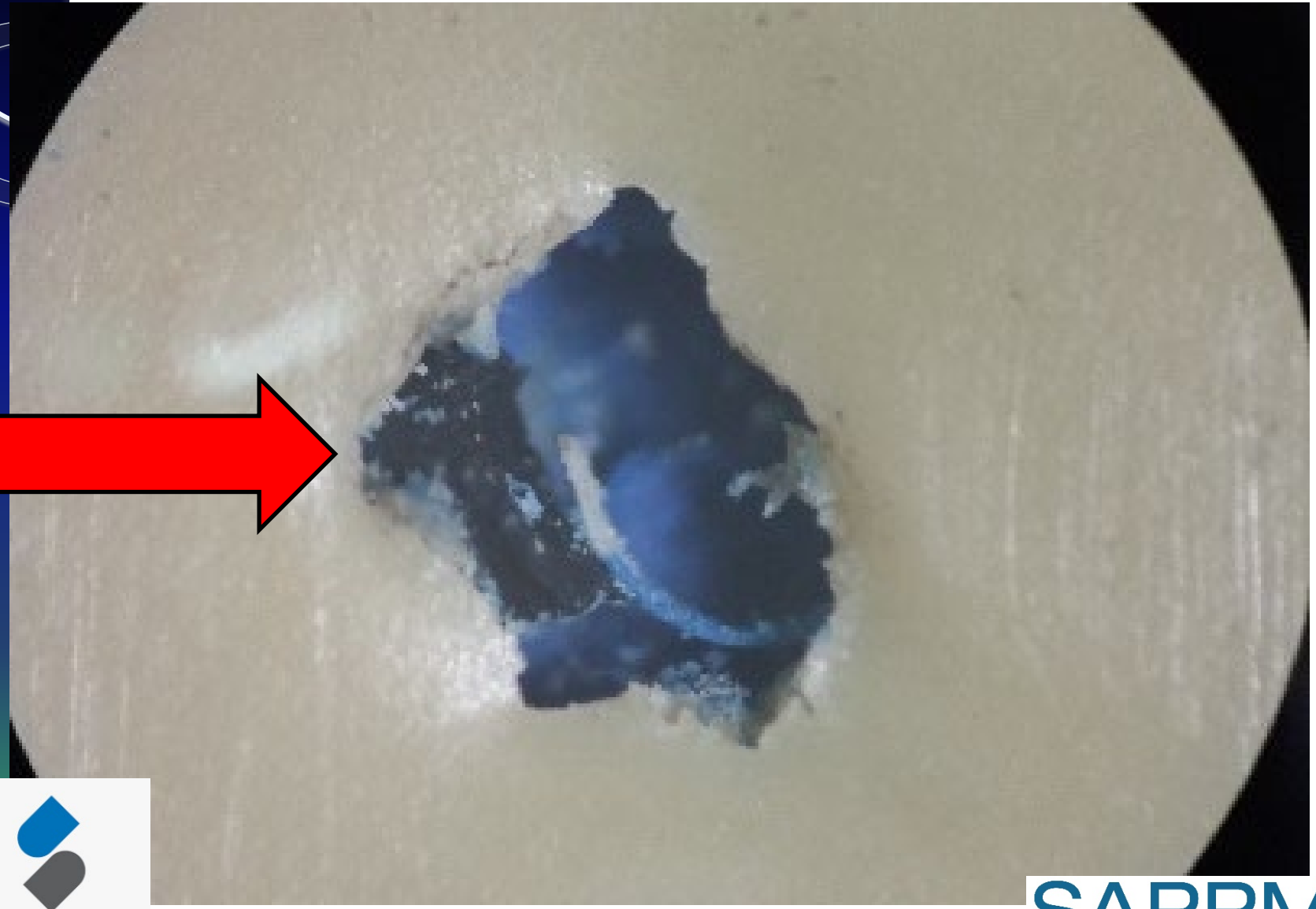


Chemically Tempered Glass

Fatigue Striations



Dispersion Issues



Temperature



Questions and Answers



Renier Snyman

25-02-2021



Understanding failures leads to growth and improvement.



Thank You

*Participants
Audience
& Organizers*



Questions and Answers



ian@sappma.co.za
admin@sappma.co.za