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# FROM THE CORNER OFFICE

## FOREWORD

Hi Everyone!!

Thanks for the opportunity to write a small article in the ICO newsletter, it's a privilege!

Well I'm still a newbie here, just onto my third month with ICO Singapore and enjoying my stay here so far.

I received a lovely warm welcome from all the ICO Singapore staff when I arrived here and had the opportunity to meet the rest of the Management Team from other regions during our last MRM meeting. I have also managed to squeeze in a three day API Q1 awareness course held by Dr Santosh and his team and a lifting awareness course conducted by Chris Nobles, both of which were very interesting. For the last seven years I have been working in Brunei, where I met my darling wife Sara, she will be joining me here in Singapore with our son later in the Month.

We have some exciting new prospects on the horizon and in the process of setting up a new OCTG storage, Inspection and maintenance yard in Singapore in which we're all very excited about.

Andrew Agnello.  
Country Manager,  
Singapore.

### Editing Team:

**Dr. Santosh Gupte**  
**Amey Saware**

### Chief Editors

**Mrugesh Paralikar**

# NEWS FROM THE CORPORATE OFFICE

- Corporate Management Review Meeting was held between 15 May 2014 to 17 May 2014.
- Training program on Quality Management System based on API Q1 9<sup>th</sup> Ed. and Web Based Quality Management System.
- Implemented ICO's Web Based Quality Management System according to API Q1 9<sup>th</sup> Edition from 1 June 2014.
- Started PMI services for Baker - BOT, Australia.
- Yard at ICO Singapore is under major changes for accommodating inspection beds for Drill Pipes & A-Frame for off shore container inspection.
- ICO Jakarta is shifted to new & larger office.
- ICO Australia is shifted to new office & guest house.
- ICO Australia started new office at Sale.
- Mr. Jay Garcia has joined as Corporate Finance & Administration Manager at Singapore.
- Mr. Andrew Agnello joined as Country Manager of ICO Singapore.
- Mr. Amey Saware passed ASNT Level III and transferred to ICO Australia.
- ICO Inspectors have undergone ISO 9712 training & certification program at Singapore & Jakarta.

# Corp. MRM 2014



**Corporate Management Review Meeting @  
ICO Corporate Office, Singapore**



# Corp. AMR 2014



**Assistant Management Representative's  
Training Program on API Q1 9<sup>th</sup> Ed.  
@ ICO Corporate Office, Singapore**



# Baker BOT, Australia

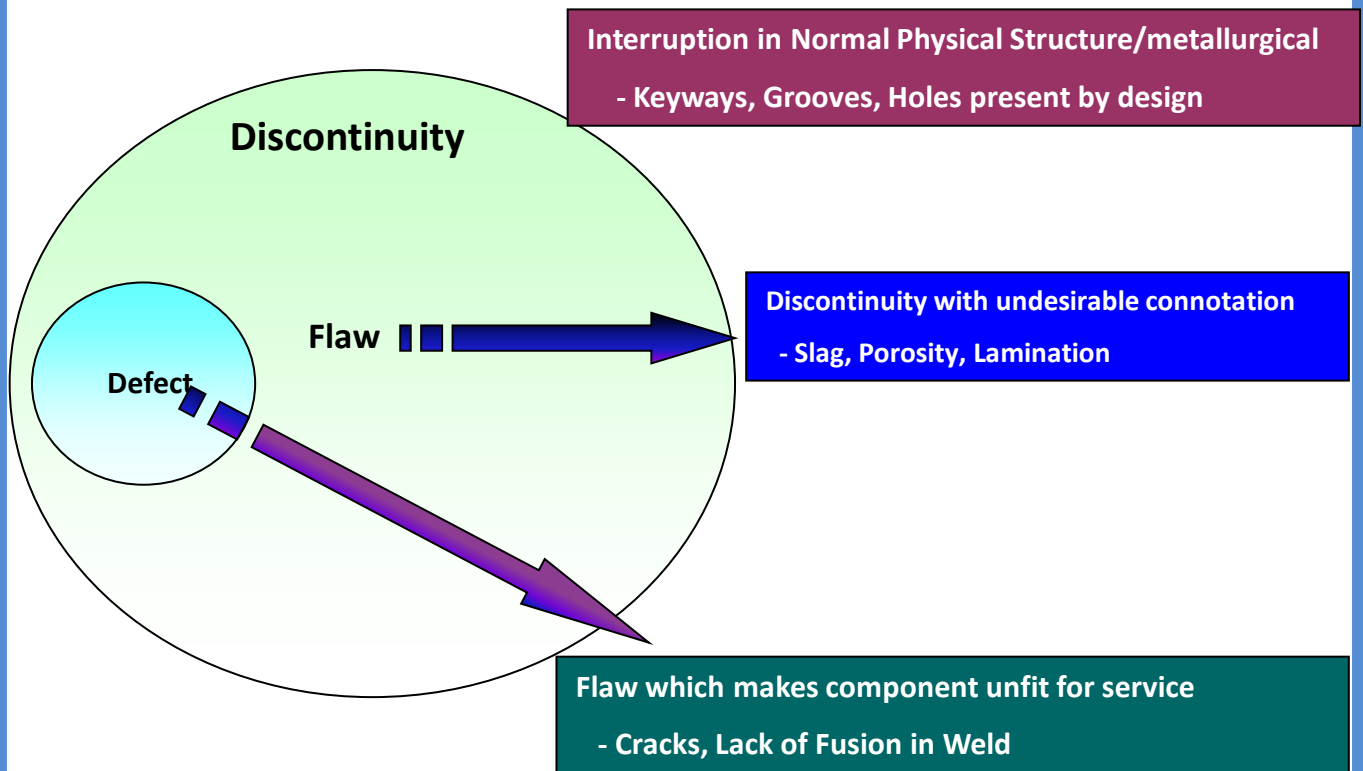


Element	REF	Burn 1	Burn 2	Burn 3	Burn 4	Burn 5	Burn 6	Average	STD
P238	REF	445787	443309	437977				442348	0.9
P436	REF	744098	731840	709734				728567	2.7
P441	REF	327893	318082	324144				323377	1.5
C022	278544	198351	194105	191250				194369	1.8
C038	5086838	579217	571474	582832				577737	1.0
H028	4907328	564310	563395					562829	0.3
V 10	5454188	734901	721981					725815	1.1
V 41	2277368	206056	208555					207252	0.6
V 40	1782378	199124	199061					199092	1.2



## PMI Training (Lunch N Learn)

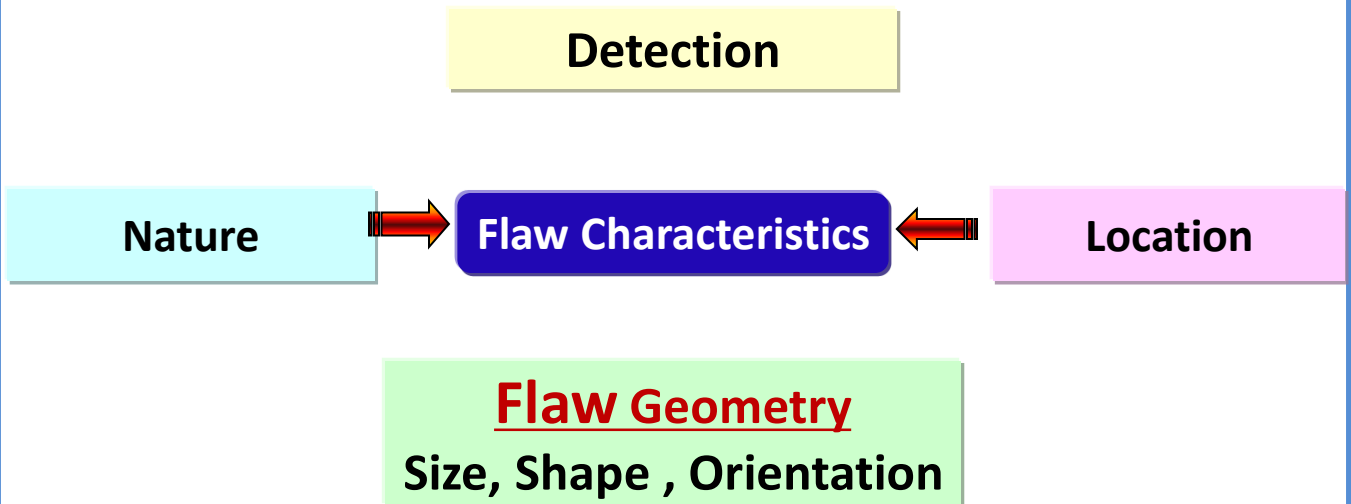
# Defects In Material & NDT



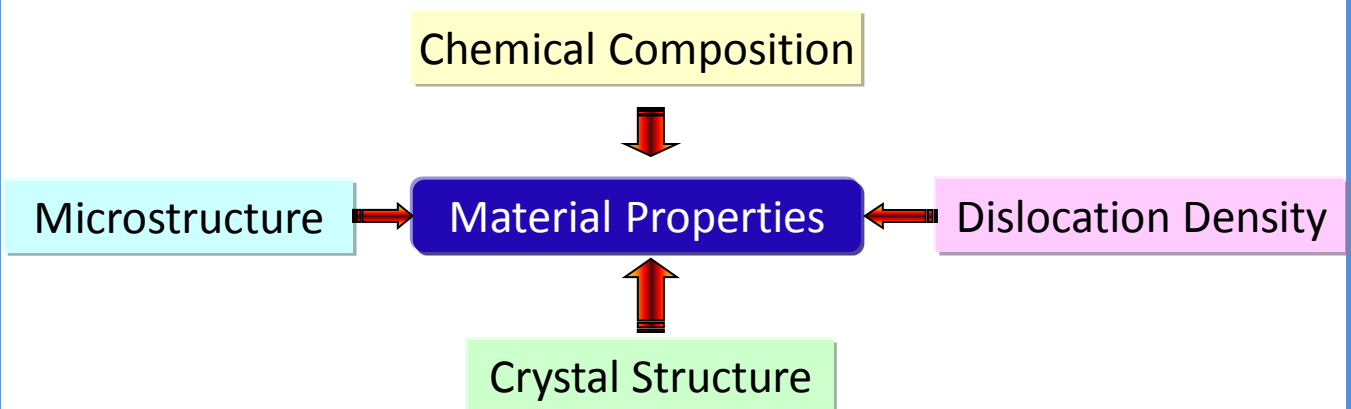
## Living with Flaws

- A: Flaws which will not grow at all during service
- B: Flaw which will not grow to critical size during lifetime
- C: Flaw which will grow to critical size in next few inspection intervals
- D: Flaw size will grow to critical size before next inspection

# Components of Flaw Characterization:



## Metallurgical Characteristics Controlling Material Properties



Heat Treatment: Commonly employed Processing Treatment to modify Metallurgical Characteristics



# Classification of Engineering Products

## **Based on Manufacturing Route**

### **I Castings**

Melting - Pouring into Mould Cavity - Solidification

### **II Powder Metallurgy Products**

Powder Preparation - Pressing into Mould Cavity - Sintering

### **III Wrought Products**

Cast ingot - Mechanical Working - Machining - Welding - Heat Treatment

## **Defects in Materials**

### **Origin & Characteristics**

#### **I Inherent Discontinuities**

- \* Melting, Casting & Solidification

#### **II Processing Discontinuities**

- \* Mechanical Working (Hot/Cold)

- Forging, Rolling, Extrusion, Forming

- \* Welding

- \* Heat Treatment

#### **III Service Discontinuities**

- \* Fatigue, SCC, Creep

**Discontinuities are not necessarily Defects**

## Casting vs. Wrought Products

- \* Physical Discontinuities
- \* Chemical Inhomogeneities
- \* Microstructural Non uniformities

**Lower Quality Factor or Higher Safety Factor for Castings  
as compared to Wrought Products**

**Weld ~ Mini Casting**

## Quality Requirements

Metallurgical	NDT	Dimensional
<ul style="list-style-type: none"><li>• Chemical Composition</li><li>• Microstructure</li><li>• Mechanical Properties</li><li>• Corrosion Properties</li></ul>	Freedom from Unacceptable Flaws affecting Structural Integrity	<b>Stress</b> <ul style="list-style-type: none"><li>- Magnitude</li><li>- Concentration</li><li>- Distribution</li></ul>

## Defects in Materials Origin, Nature & Significance

- Casting
- Forging
- Rolling
- Heat Treatment
- Welding

### Casting Defects

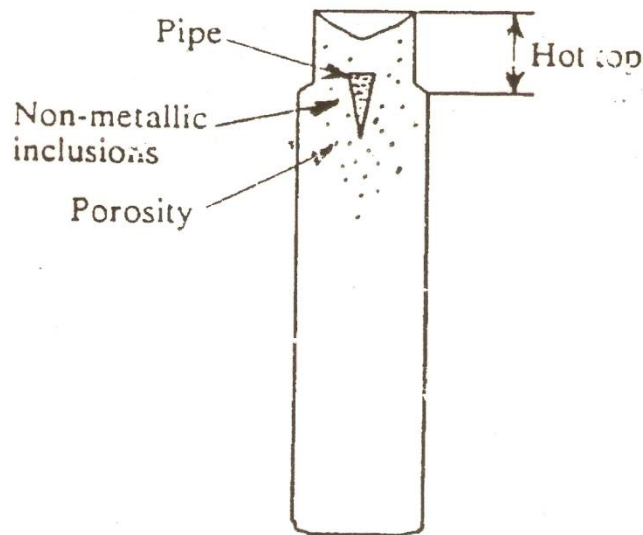
- International Committee of Foundry Technical Association
- 111 casting defects in 7 categories
  - Metallic Projections
  - Cavities
  - Discontinuities
  - Defects (Surface)
  - Incomplete Casting
- Incorrect Dimensions
  - Inclusion or Structural Anomalies

### Defects in Casting

- \* **Gas Defects – Blow Holes, Porosities**
- \* **Shrinkage Cavity – Piping**
- \* **Non-Metallic Inclusion – Exogenous, Indigenous**
- \* **Chemical Inhomogeneities – Segregation**
- \* **Contraction Defects (stress) – Hot Tears, Cold Cracks**
- \* **Shaping Faults – Misrun, Cold Shuts**

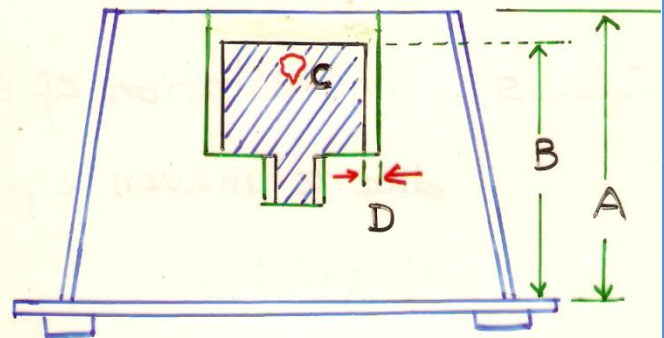


# Defects in Ingots



## Casting Defects: Shrinkage Cavity

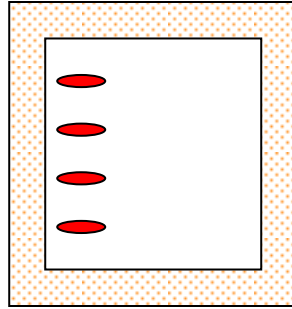
- A depression or an internal void in a casting that results from volume contraction during solidification



Level A	Superheated liquid metal filled to the top pf the mould
Level B	Liquid shrinks on cooling to freezing temperature
Area C	During L to S contraction, further redn. in volume Localized near top of the ingot (Freezes last)
Distance D	Solid metal pulls away from mould wall as it contracts

## Casting Defects: Blow Holes

- Balloon shaped cavities at or below the surface of the casting



- Cause
  - High moisture or organic content of sand mould gives excessive steam or CO
  - Low permeability of mould due to excess clay content or excessive ramming

## Casting Defects: Porosity

- Very small gas holes uniformly dispersed through the entire casting

- Gas solubility more in liquid than solid

$S_L$

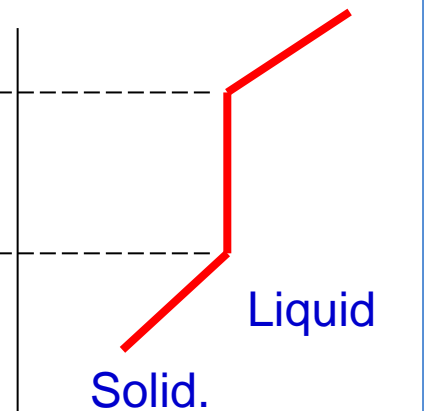
- Microporosity: Gas trapped within growing dendrites

$S_S$

- To reduce gas in the liquid metal

- Keep minimum superheat
- Vacuum melting or Vacuum degassing
- Inert gas bubbling

Gas  
Solubility



M.P.

# Inclusions

- Non-metallic or metallic phases in a metallic matrix

## Exogenous

- Derived from external causes
- Slag, entrapped mould material and refractory
- Macroscopic
- Non-uniform distribution

## Indigenous

- Inherent in molten metal treatment
- Sulphides, Nitrides, Oxides ( $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ )
- Microscopic
- Uniformly distribution

Iron Making: Reduction Process,  $\text{Fe}_2\text{O}_3$  CO/C Fe

Steel Making: Oxidation – C, S, P etc

High O in steel: Porosity, De-oxidation by Al, Si: Inclusions ( $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ )

## Inclusion Rating in Steel

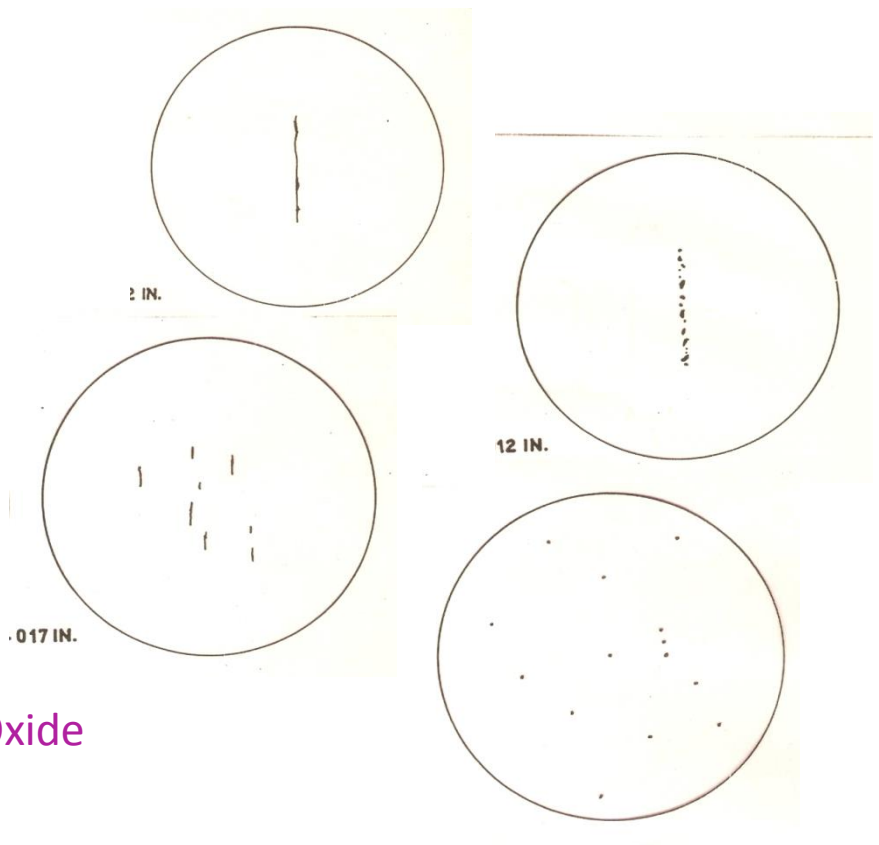
- Four types of non-metallic inclusions: Thin & Heavy

- Type A: Sulphide

- Type B: Alumina

- Type C: Silicate

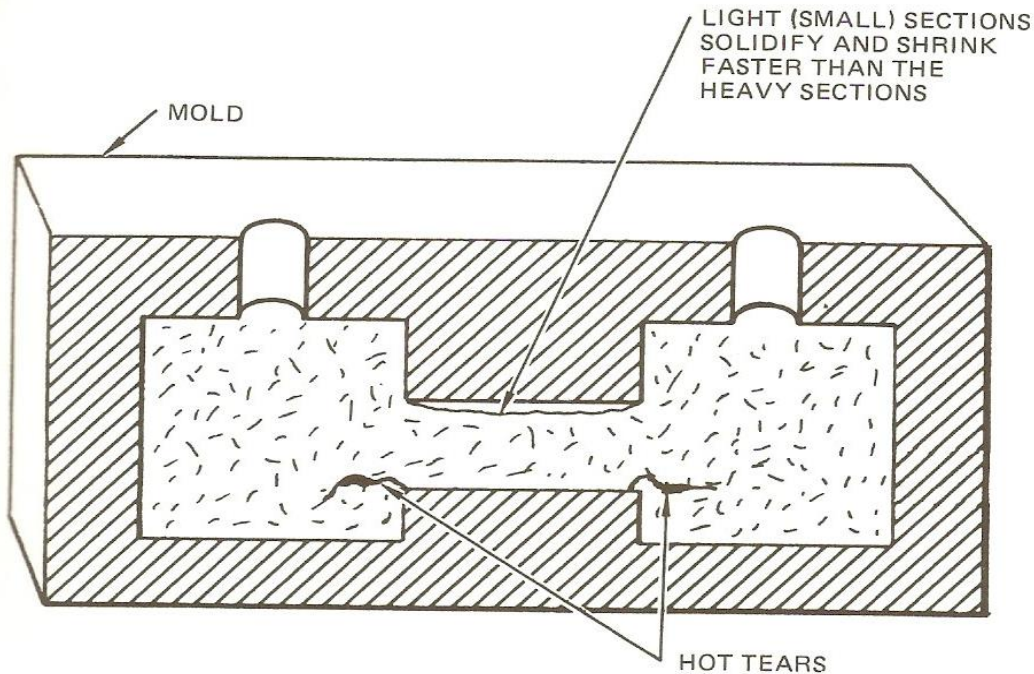
- Type D: Globular Oxide





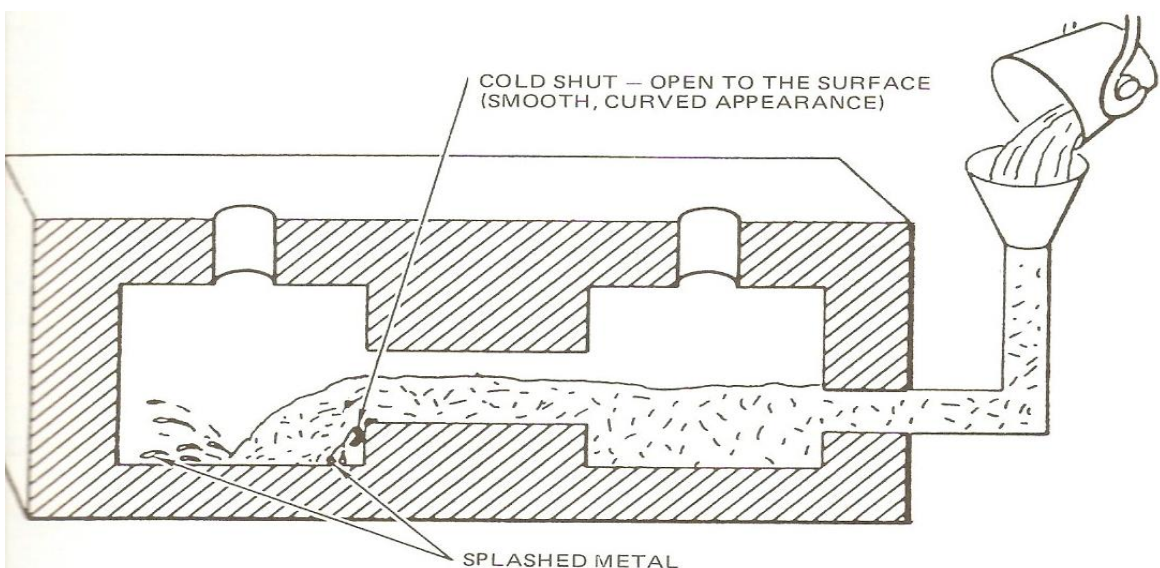
## Casting Defects: Hot Tears

- Caused by unequal shrinking of light and heavy sections of a casting as the metal cools



## Casting Defects: Cold Shuts

- Forms when molten metal meets the already solidified or relatively cold metal
- Can also be formed by lack of fusion between the two intercepting surfaces of molten metal at different temperatures



## Mechanical Working

- Involves Plastic Deformation: Change in shape and size but no volume change
- Hot working ( $\text{Temp} > T_{re}$ ) & Cold Working ( $\text{Temp} < T_{re}$ )

Process	Hot Working	Cold Working
Forging	✓	
Rolling	✓	✓
Extrusion	✓	✓
Drawing		✓

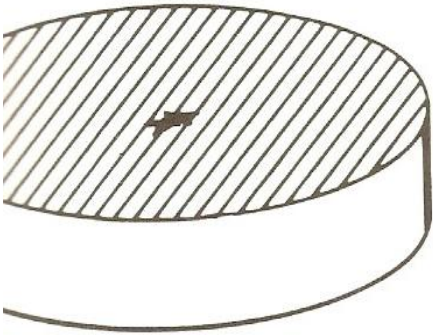
- Tungsten – Working at 1000 C: Cold Working
- Lead – Working at RT: Hot Working

## Forging Defects

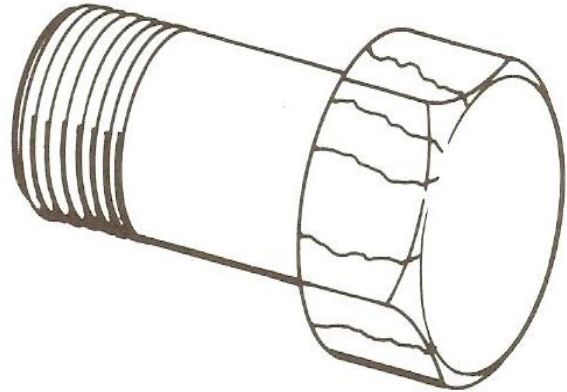
- Bursts
- Laps
- Hydrogen Flakes
- Flow Lines

## Forging Defects: Burst

- Rupture caused by forging at improper temperature
- Can be internal or external



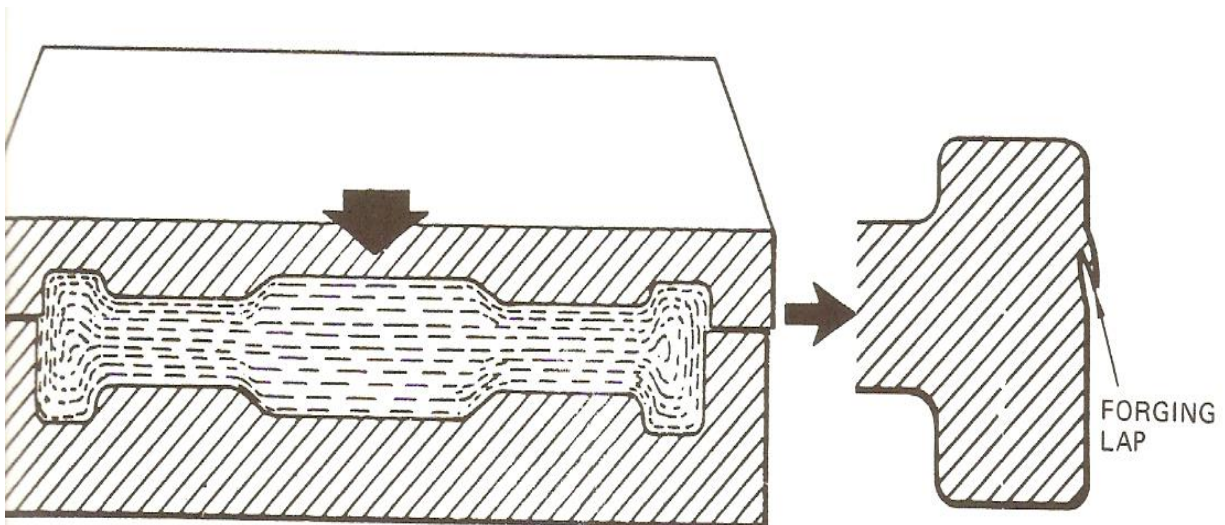
INTERNAL  
BURST  
(SUBSURFACE)



EXTERNAL  
BURST OR CRACK  
(OPEN TO THE SURFACE)

## Forging Defects: Lap

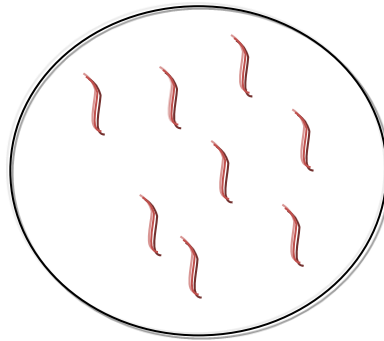
- It is a discontinuity caused by folding of metal in a thin plate on the surface of the forging
- Improper matching of mating surfaces of the two forging dies





## Forging Defects: Hydrogen Flakes

- Randomly oriented internal thermal cracks in steel resulting from critical combination of stress and hydrogen content
- On an etched surface, they appear as short discontinuous cracks



## Forging Defects: Improper Flow Lines

- Patterns that reveal how the grain structure follows the direction of working in forging
- Flow lines refer to direction of inclusion deformation during forging. Flow lines should not cut the surface to avoid failures due to high HCF.
- These are revealed macro-etching
- Optimizing grain flow orientation maximizes mech. properties

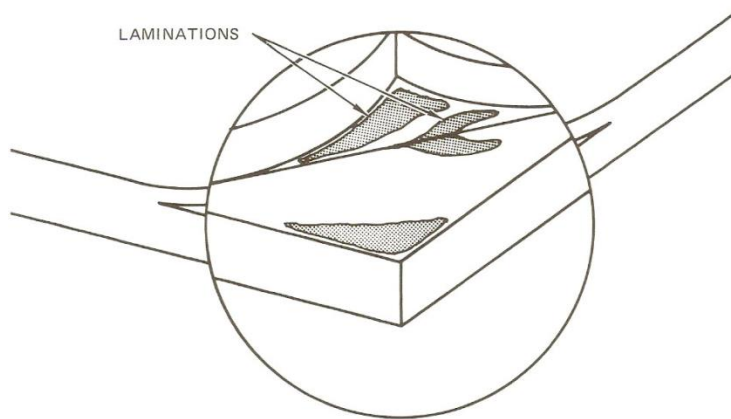


# Rolling Defects

- Laminations
- Stringers
- Seams

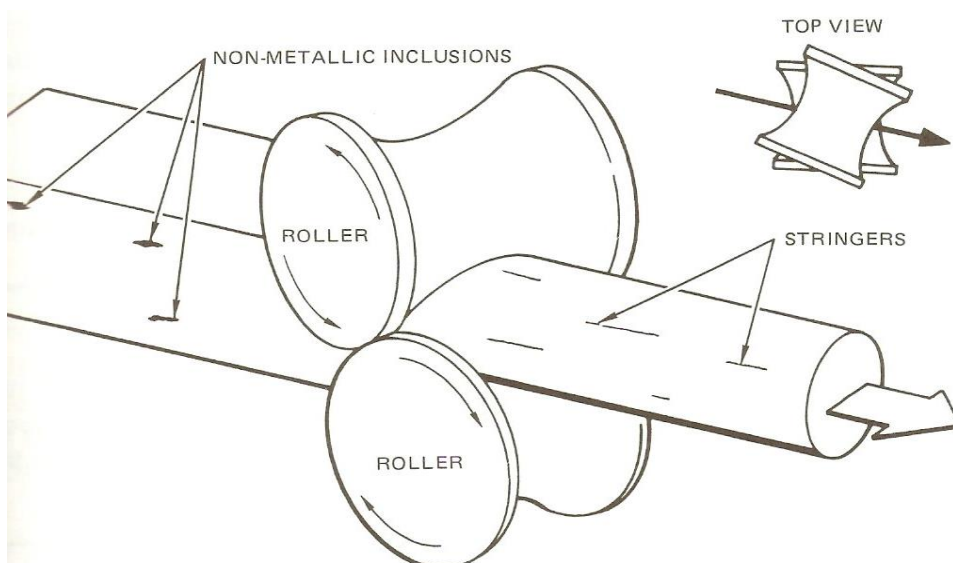
## Rolling Defects: Laminations

- Defects with separation or weakness generally aligned parallel to the worked surface of the metal
- May be a result of pipe, blister, seams, inclusions or segregations elongated and made directional by working



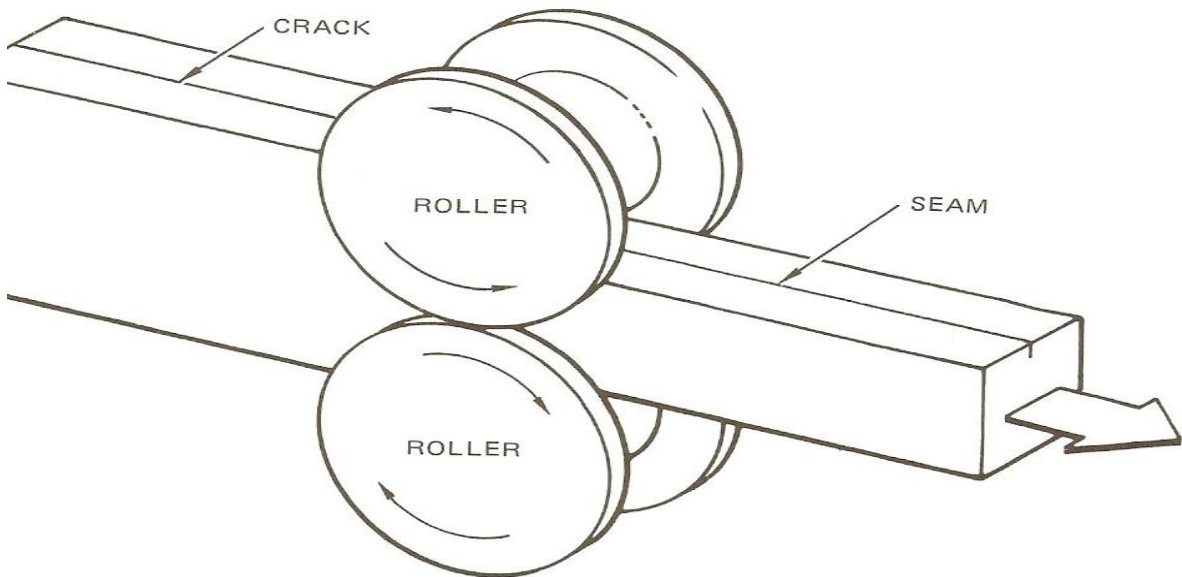
## Rolling Defects: Stringers

- Longer and thinner configuration of non-metallic inclusions aligned in the direction of working
- Commonly the term is associated with oxide or sulphide inclusions in metals

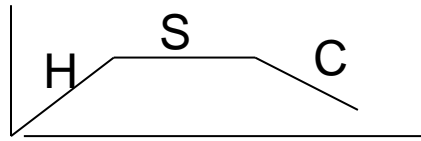


## Rolling Defects: Seams

- Un-welded fold or lap that appears as a crack
- Results from a defect obtained in casting or working
- Always open to surface



## Heat Treatment

- Heating and Cooling operations applied to metals and alloys in solid state to obtain desired properties
- Purpose
  - Mechanical properties: Strength ↑ ↓ Ductility ↑
  - Toughness ↑
  - Corrosion Resistance ↑
  - Dimensional Stability: Residual stress ↓
- Heat Treatment Cycle: Min. Three Steps 
- Metallurgical characteristics controlling properties
  - Chemical Composition
  - Dislocation Density
  - Microstructure
  - Texture



## Heat Treatment of Steels

- Annealing
- Normalizing
- Hardening
- Tempering
- Martempering
- Austempering

## Misconceptions regarding NDT

No defects found & reported Means –No defects in the component	No NDT technique capable of detecting all defects (Uncertainty in detection)
Defects measured as 5mm means that defect actually is 5mm	Uncertainty in Defect sizing by NDT
If NDT reports defect growth or non- growth then this is actually the case	Comparison of two sizing has their own errors
100% Inspection Coverage	Not necessarily 100% of component inspected
Hard copy results can't lie	Hard copy results only as good as tech. & data used to produce them.
NDT as per National /Int. standard always appropriate.	Standards only relevant to specific circumstances & include knowledge at the time of development.NDT reqs. need to be checked against the Std. to see its relevance to particular situation.

# Health Tips...



## 7 Ways To Lower Your Blood Pressure...

High blood pressure is a common problem that can cause serious diseases such as stroke, heart attack, and cardiovascular disease. It takes a balanced lifestyle patterns to maintain the blood pressure remained at normal conditions. Nevertheless, there are some people who still use medicine but the result is not effective yet, but there are also some simple ways to control and lower your blood pressure:

### 1. Sport

With exercise , you can also lower your high blood pressure and can be protected from various diseases . It is advisable to do exercise several times a week. Do exercise such as jogging and cycling for example, exercise about 30 to 60 minutes .

### 2. Consumption of potassium

Potassium can be found in some foods such as banana, papaya, spinach, and cabbage. Potassium is beneficial in helping the body to lower blood pressure. Intake of potassium for adults 3.510mg per day.

### 3. Lose weight

Excess body weight is one of the causes of high blood pressure or hypertension . Efforts are made to reduce the weight by exercising . By reducing your body weight, you can lower your systolic blood pressure by 2-10 points .

#### **4. Not Smoking**

Smoking is not good for health. This is because cigarettes contain nicotine which can cause excessive adrenaline production. Adrenaline can make blood pressure and heart work harder.

#### **5. Reduce salt intake**

Reducing salt intake can help to lower the blood pressure. This is because salt can increase the volume and pressure of blood in your arteries. Consume no more than 2400mg of salt per day, or approximately 1 teaspoon. Simply by consuming salt less than 1600mg per day or approximately 2/3 teaspoon can reduce blood pressure.

#### **6. Avoid alcohol**

Consuming alcohol is not good for health especially for blood pressure. Alcohol consumption can lead to high blood pressure which can increase the risk of hypertension.

#### **7. Avoid stress**

Stress is the cause of several diseases and is also associated with high blood pressure. Stress can cause a rise in blood pressure temporarily. Avoid yourself from stress. Breathing exercises are a great way to reduce stress and may reduce the risk of high blood pressure.

# Keep smiling always, life will smile to you!

Everyday productivity and efficiency practically depend on how you feel. More often than not, happy people are more effective at work and have better relationships. Of course, it is normal to be sad every once in a while, but there are days that anxiety gets the better of you. It is during these times where stress and anxiety attacks affect your normal course of life. You find it difficult to get things done or even at least get through the day. Even simple works, if you are not happy, you will feel hard to do and easy make mistakes and vice versa even the difficult things, if you are happy, you can do it easy also. If you ever have a bad day, here are some ways of lifting your spirits and getting you back on track, find back your smile.



**ICO China Office girls  
(Eva, Barbara, & Zoe)**

1. Try to share with somebody. Go out with a friend or work-mate for a walk, a cup of coffee or a lunch date. You need not discuss your problems at all. Sometimes all you need is a good laugh to get you going again. Have a good chat with a loved one. Just talk about how your day went to lighten up your mood. A good hug or a pat on the back from people you care about are one of the best comforts that would get you through rough days. Look at your kids, the sweet smile, naive face. Nothing /Nobody can beat you, because they are behind you.



**(My family: Barbara , Le Minh Kimchen & Le Minh hanh)**



2. Get some relaxation time. This is one of the most obvious solutions for anxiety. Too much tension in your body affects your mood. Try to be calm. Keeping deep breathing, empty your mind, and make muscle relaxed. These are most helpful in reducing stress. Read a good book. Reading is always a perfect way of getting your mind off things. Just find a cozy spot where you can enjoy silently. Feel refreshed or even inspired after a good read



**(Loyang valley –  
ICO SGP Staff house )**

3. Exercise on your free time. Some people find it more relaxing when they do exercise. Go out for some brisk walking, stretch your waist, have a view in front of window in office as you are in break time. There is no need for a structured gym routine; what is important is that you keep on moving.
4. Play and have fun. You can get fun for what you love. Go out to play with your kids or go for a round of your favorite movie. For ladies, South Korean TV soaps is the best way always. I recommend the popular TV soaps 《You from starts》 《The sun and the moon》 , I believe you will not refuse the romantic music, psychedelic plot, pretty girls and handsome youths. But don't Shopping, or you will regret you bought what you no need to buy after you wake up. The perfect way to shake off the blues is to find amusement.



**(Maylen and Rosnah)**

5. Do chores. Clean up your room, do the laundry, or even cook a meal. Not only would you find cleaning your mood, getting them done is an accomplishment. Good luck always go into cleaning room, cleaning office.



**(Rowena & Nadia)**

6. Do grant or help. You can devote some of your time and money to the needy by donating or volunteering in a charitable institution. Just a little, a little time, a little money, but what you give can make a big difference to other people's lives. At the same time, you get a sense of fulfillment by doing your part in helping society.

**(Barbara & Som from ICO Thailand)**



7. Take a shower in flower essence and music, it can make you relax and cool down. You would feel actually refreshed and rejuvenated after getting cleaned-up, not only physically but also psychologically. More or less, you would feel like you are taking on the day with a fresh start.



**(Melody & Som)**

8. Enjoying your favorite food. If you are not happy, why not let your favorite food to provoke your tongue? Banana will give you an amazing feeling.(Note: It is "Banana" , not "Barbara") People always get the greatest satisfaction from delicious food. Nobody refuse the food. Chocolate mousse cake with blueberry brings you to sunny afternoon.



**Melody & Barbara (enjoying the salad cooked by Jay)**





Being an efficient and happy person can be as simple as knowing how to take care of your emotional well being. Whenever you feel down, turn on to habits or activities that ease anxiety or take your mind off things for a while. There are a lot of ways of improving your mood and de-stressing. It is just a matter of finding out what works for you. I believe the girl who loves smiling cannot have a bad luck!

**Now pull yourself together!!  
Keep smile! Good luck to everybody!**



**(ICO Girls in ICO Singapore office---always smiling)**



# BASIC FIRE FIGHTING TRAINING @ ICO, THAILAND









# Messages & Slogans



## 5 Healthy Habits

1. Remove Bad Foods
2. Eat Whole Foods
3. Natural Cleaners
4. Preventive Care
5. Exercise

# Newsletter Team



Andrew Agnello – Country Manager.  
Article : *Foreword*



Santosh Gupte – Director Quality.  
*Editing Team*  
Article : *Defects In Material & NDT*



Shrikant Sawant – Corp Auditor /  
Training Manager  
Article : *PMI Training (Lunch N Learn @  
Baker BOT, Australia)*



Mathew P. V. – NDT Trainer  
Photographs : *AMR Training*



Amey Saware – Quality Assurance Engineer  
*Editing Team*



Mrugesh Paralikar – Corp AMR/DC/IT  
*Chief Editor*

# Newsletter Team



Ridwansyah

***AMR (Jakarta, Indonesia)***

Article : ***7 Ways to Lower Your Blood Pressure***



Barbara Jin

***AMR (Tianjin, China)***

Article : ***Keep Smiling Always, Life Will Smile To You!***



Ms. Sumalee Kornsing

***AMR (Thailand)***

Photographs : ***Basic Fire Fighting Training***