Metal Forming

A news letter dedicated to Forging Industry

Issue : 79 | For Private Circulation | August 2024

Dear Members,

We were happy to state that the next issue of METAL FORMING Bulletin is ready and is being sent to you.

This practice of publishing Bulletin will continue.

We are also happy to say that one of the learned members, Mr. W. N. Landekar, who was a forger and now consultant to many forge shops and who also manufactures furnaces has actively contributed to the knowledge of die failure. With his vast experience he has shared his points. With his permission the same is reproduced below :

By Mr. W. N. Landekar

1. Most important factor is preheating the dies
2. Die design. e.g. Depth to width ratio sticking area to suit to the equipment you are using for number of operations
3. Temperature of hot billet
4. The temperature of last blow
5. The forge temperature for Titanium, Steel or Copper
6. Use of die lubrication
7. Uniformity of die temperature
8. Cut weight of billet
9. Billet weight with respect to forging equipment capacity
10. Die heat treatment
11. Die material
12. Wing clearance
13. Top shank clearance
14. Key fitment
15. Holder design in case of upsetter.
16. Packing material

We expect similar contributions from other members who have spent their life in the forging industry

With Best Regards,
Bhalchandra V. Joglekar - Editor

FOR YOU

? **Where concept of TRIZ can be applied?** ?

BULLETIN 79

HOW TO FIND ROOT CAUSE OF FAILURE

When one tries to find out root causes for any non-conformities , common and universally used methods are -- 8D problem solving technique, suggestion scheme, Quality Circle, 7 QC tools etc. These are effective, but at times time consuming.

A Russian came with another method, now popular by name TRIZ. We have a person from Pune who has passed level 3 TRIZ exam. Many auto industries from west and east have successfully used these techniques for improvements

A brief information downloaded from MINDTOOLS is reproduced below

Projects don't always run smoothly. Even with all the analysis and data you need at your fingertips, sometimes you just can't see a way forward. At times like these, you need to develop creative solutions to the problems you face.

Chances are you already know about brainstorming, which can help with this sort of situation. But brainstorming depends on intuition and the existing knowledge of team members, and its results are often unpredictable and unrepeatable.

TRIZ, however, is a problem-solving philosophy based on logic, data and research, rather than on intuition.

It draws on the past knowledge and ingenuity of thousands of engineers to speed up creative problem solving for project teams. Its approach brings repeatability, predictability and reliability to the problem-solving process and delivers a set of dependable tools.

This article walks you through the essentials of TRIZ.

What is TRIZ?

TRIZ is the Russian acronym for the "Theory of Inventive Problem Solving," an international system of creativity developed in the U.S.S.R. between 1946 and 1985, by engineer and scientist Genrich S. Altshuller and his colleagues.

According to TRIZ, universal principles of creativity form the basis of innovation. TRIZ identifies and codifies these principles, and uses them to make the creative process more predictable.

In other words, whatever problem you're facing, somebody, somewhere, has already solved it (or one very like it). Creative problem solving involves finding that solution and adapting it to your problem.

TRIZ is most useful in roles such as product development, design engineering, and process management. For example, Six Sigma quality improvement processes often make use of TRIZ.

The Key TRIZ Tools

Let's look at two of the central concepts behind TRIZ: generalizing problems and solutions, and eliminating contradictions.

1. Generalizing Problems and Solutions

The primary findings of TRIZ research are as follows:

- Problems and solutions are repeated across industries and sciences. By representing a problem as a "contradiction" (we explore this later in this article), you can predict creative solutions to that problem.
- Patterns of technical evolution tend to repeat themselves across industries and sciences.
- Creative innovations often use scientific effects outside the field where they were developed.

Using TRIZ consists of learning these repeating patterns of problem and solution, understanding the contradictions present in a situation, and developing new methods of using scientific effects.

You then apply the general TRIZ patterns to the specific situation that confronts you, and discover a generalized version of the problem.

Here, you take the specific problem that you face and generalize it to one of the TRIZ general problems. From the TRIZ general problems, you identify the general TRIZ solution you need, and then consider how you can apply it to your specific problem.

The TRIZ databases are actually a collection of "open source" resources compiled by users and aficionados of the system (such as the 40 Principles and 76 Standard Solutions, which we look at, below).

2. Eliminating Contradictions

Another fundamental TRIZ concept is that there are fundamental contradictions at the root of most problems. In many cases, a reliable way to solve a problem is to eliminate these contradictions.

TRIZ recognizes two categories of contradictions:

1. Technical contradictions. These are classical engineering "trade-offs," where you can't reach the desired state because something else in the system prevents it. In other words, when something gets better, something else automatically gets worse. For example:

- The product gets stronger (good), but the weight increases (bad).
- Service is customized to each customer (good), but the service delivery system gets complicated (bad).
- Training is comprehensive (good), but it keeps employees away from their assignments (bad).

The key technical contradictions are summarized in the TRIZ Contradiction Matrix. As with all TRIZ resources, it takes time and study to become familiar with the Contradiction Matrix.

2. Physical (or "inherent") contradictions. These are situations in which an object or system suffers contradictory, opposite requirements. Everyday examples include:

- Software should be complex (to have many features), but simple (to be easy to learn).
- Coffee should be hot (to be enjoyed), but cool (to avoid burning the drinker).
- An umbrella should be large (to keep the rain off), but small (to be manoeuvrable in a crowd).

You can solve physical contradictions with the TRIZ Separation Principles. These separate your requirements according to basic categories of Space, Time and Scale.

How to Use TRIZ Principles – an Example

Begin to explore TRIZ by applying it to a simple, practical problem.

For example, consider the specific problem of a furniture store in a small building. The store wants to attract customers, so it needs to have its goods on display. But it also needs to have enough storage space to keep a range of products ready for sale.

Using TRIZ, you can establish that the store has a physical contradiction. The furniture needs to be large (to be useful and attractive), but also small (to be stored in as little space as possible).

Using TRIZ, the store owners generalize this contradiction into a general problem and apply one of the 40 Principles of Problem Solving – a key TRIZ technique – to it. They find a viable general solution in Principle 1 – Segmentation. This advocate dividing an object or system into different parts, or making it easy to take apart. This could lead the owners to devise flat-pack versions of their furniture, so that display models can take up the room that they need while inventory occupies much less space per unit. This is the specific solution.

You, too, can use the 40 Principles of Problem Solving, or the 40 Inventive Principles, and the Contradiction Matrix to help you with your problem-solving.

Five Top TRIZ Concepts and Techniques

TRIZ comes with a range of ideas and techniques beyond the basic principles outlined above. Some are conceptual and analytical, such as:

- The Law of Ideality. This states that any system tends to become more reliable throughout its life, through regular improvement.
- Functional Modelling, Analysis and Trimming. TRIZ uses these methods to define problems.
- Locating the Zones of Conflict. (This is known to Six Sigma problem-solvers as "Root Cause Analysis.")
- Some are more prescriptive. For example:
- The Laws of Technical Evolution and Technology Forecasting. These categorize technical evolution by demand, function and system.
- The 76 Standard Solutions. These are specific solutions devised to a range of common problems in design and innovation.
- You can use one such tool or many to solve a problem, depending on its nature.

Key Points

TRIZ is a system of creative problem solving, commonly used in engineering and process management. It follows four basic steps:

1. Define your specific problem.
2. Find the TRIZ generalized problem that matches it.
3. Find the generalized solution that solves the generalized problem.
4. Adapt the generalized solution to solve your specific problem.

Most problems stem from technical or physical contradictions. Apply one of hundreds of TRIZ principles and laws to eliminate these contradictions, and you can solve the problem.

FORGING TECHNOLOGY FORUM

Conference & Exhibition on

INNOVATIVE APPROACH - KEY TO GROWTH & SUSTAINABILITY

26 – 27 (Thu-Fri) September 2024

The Pride Hotel, 5, University Road, Pune - 411005, Maharashtra, India

Topics -

1. Sustainability in Forging

- Environment friendly practices
- Energy Conservation
- Material Optimization
- CO2 Reduction
- Waste Management

2. Needs of EV / HYBRID OEM's Support by

- Forging Manufacturers / DFM
- Service Providers (Simulation)s
- Raw Material Manufacturers
- Voice of the Customers

3. Industry 4.0

- Automation
- Process Digitisation
- Challenges & Solutions
- Cost Benefits

4. Upcoming Technologies

- Equipment
- Materials
- Processes
- Measurement & Testing

5. Skill Development

- National Skill Development Corporation(NSDC)
- People Operations (HR)
- National Institute for Advanced Manufacturing Technology (NIAMT)
- Nettur Technical Training Foundation (NTTF)
- Top Management

For Details Contact

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Prabhat Road, Pune - 411 004 India.
Mobile: **+91 97647 11315**
fftc@arkeycell.com, admin@arkeycell.com I **www.forgingtechnologyforum.org**

REPORT

Held on: 23rd June 2024 (Sun)
at ARKEY OFFICE, Pune - 411 004

SUBJECT
RESPONSIBLE STEEL AND FORGINGS – THE ESG PERSPECTIVE

Mr. Uday Gupta, Director, Eco eMarket, Senior adviser, Centre for Responsible Business delivered first TEA TALK on "RESPONSIBLE STEEL & FORGINGS - THE ESG PERSPECTIVE" on 23rd June 2024. Really subject was eye-opener and Mr. Uday Gupta detailed very minutely and effectively. This lead to a Question Answer session. Members present appreciated the efforts.

FORGING TECHNOLOGY FORUM

TOGETHER ONLY WE CAN REACH OUR GOALS

Arkey Technical Training and Research Institute

FORGING TECHNOLOGY FORUM

TRIZ
Innovation Solutions

FORGING TECHNOLOGY FORUM
TEA TALK

Date: 28th July 2024 (Sun)
Time: 06.30 p.m.
Venue : ARKEY OFFICE,
'Guruprasad', 1st Floor,
37/4/A, 6th Lane, Prabhat Road,
Pune - 411 004, India

Can be attended by Businessmen, Employees, Students etc.

SPEAKER
MR. HEMANT PARDIKAR

TAKE AWAY

1) **Introduction to TRIZ- an innovation method based on study of millions of patents.**
2) **Use of TRIZ to create competitive edge by redesigning products and processes.**
3) **Use of TRIZ to solve chronic problems on the shop floor.**
4) **Use of TRIZ to predict technological evolution.**

ABOUT THE SPEAKER

Competencies in TRIZ (Theory of Inventive Problem Solving):- Studied TRIZ for over 5 years.
Obtained 3 levels of certifications from International TRIZ Association, 48 Rue Copernic BRUSSELS. Belgium. Trained by TRIZ masters in USA and Netherland. Presented a research paper at International TRIZ conference held at GRAZ, AUSTRIA in August 2023.
Started work on TRIZ master thesis (PhD) with a guide in Netherland.
As a corporate banker for over 25 years, he has visited several hundred shop floors and interacted with a large number of promoters and managers of a broad spectrum of industries all over the country. This includes many top business houses. As such he has a good understanding of Indian Industries from a techno- commercial perspective.

Date : 28th July 2024 (Sun)
Time : 6.30 p.m. to 7.00 p.m. - Networking
7.00 p.m. to 7.45 p.m. - Tea Talk
7.45 p.m. to 8.00 p.m. - QA & Closing

For Registration Please contact
FOUNDRY AND FORGE TRAINING CENTRE
A Division of **ARKEY TECHNICAL TRAINING & RESEARCH INSTITUTE (TRUST)**
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www.forgingtechnologyforum.org

Arkey Technical Training and Research Institute

FORGING TECHNOLOGY FORUM

Two Days Training Programme

Forging Defects & Remedies, Quality Control A Systematic Approach

9-10 August (Fri-Sat) 2024 | 9.30 a.m. to 5.30 p.m.
Venue : Arkey Conference Hall, 'Guruprasad', 2nd Floor, 37/4/A, 6th Lane, Prabhat Road, Pune-04

INTRODUCTION

We all are aware, that "Quality" of either Product or Services is first essential aspect in any Industry, which meets or exceeds customer's total requirements. As such, quality is a continuous Process which needs to be implemented through, consistent upgradation and learning. Foundry & Forge Training Centre would like to become your partner, in knowledge enhancement through effective Training.
We Offer two days exclusive training programme in different Quality activities which will help you to resolve your issues, by creating awareness, understanding the significance of Quality in company's performance. Come all to join this training, to help your organization to achieve targeted goals.

TECHNICAL TOPICS

Importance of Quality Control and Quality Assurance, Quality Systems for forging process. Dies and tool manufacturing/Inspection w.r.t. Part quality. Incomming Row Material storage and inspection system. Forging Defects and Remedies, Concept of Quality circle, Quality control Tools, seven Wastes fo Forging Production. Reducing COPQ. Standards for forged Parts w.r.t. Quality Process audit and product audit, 8D format.

FACULTIES

Mr. Vijaykumar H. Khasnis
(B.E Mechanical, M.S in Engineering Business Management).
30 Years of Experience in Forging Field. New Part R & D. (Forging), New Process Development (Machining and Forging), New Product Development and establishment, Co-Partnership Development i.e. VAVE Projects, Yield improvement.

Mr. Manohar Pawar
Qualification : BE Mechanical.
Lead Auditor/Assessor ISO 9000 QMS
Registered to International Register of Certified Auditors - IRCA(UK)
Experience : Total 33 years of experience in manufacturing industry, of which 32 years in forging industry.
Main areas/functions: Quality assurance and quality control, Quality management systems, Quality planning for new product development, Inspection jigs and fixtures planning, Company representation in quality and New product development, Vendor assessment and development, Sound knowledge in : 8D problem solving method, 7 QC tools, Cost of poor quality, Process FMEA, SPC, 3 Legged 5 why analysis, Cause and effect diagram, Mistake proofing...etc.
Associated companies :
Bharat Forge Ltd., Kalyani Forge Ltd., Aurangabad Electricals.

WHO SHOULD ATTEND

Middle Management Team (3-7 Years of Experience) from any area of Forging Industry.

KEY TAKE AWAYS:

Significance of Quality Systems as an integral part of the complete unit.

Unique Opportunity for

- Young Metallurgist
- Practicing Metallurgist
- Lab Technician
- Vendor Development Engineers
- Q/A Personnel
- Quality Assurance

To Participate & Enhance your Knowledge

* Registered delegates are requested to inform us well in advance about their problems on the subject for discussion during the programme.

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REGISTRATION FEES

Individual : Rs. 7080/-
Corporate : Rs. 19116/-
(for 3 delegates)
Inclusive of GST+Lunch+Delegate Kit

FOR DETAILS/ REGISTRATION Contact :
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Mr. D. G. Chivate : 9422010972

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