

# THE ACCELERATOR RELIABILITY FORUM

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## Abstract

A high reliability is a very important goal for most particle accelerators. The biennial Accelerator Reliability Workshop covers topics related to the design and operation of particle accelerators with a high reliability. In order to optimize the over-all reliability of an accelerator one needs to gather information on the reliability of many different subsystems. While a biennial workshop can serve as a platform for the exchange of such information, the authors aimed to provide a further channel to allow for a more timely communication: the Particle Accelerator Reliability Forum [1]. This contribution will describe the forum and advertise its usage in the community.

## INTRODUCTION

Particle accelerators are important in industry and science today. They are used for high energy physics, as synchrotron light sources - for a large variety of applications - and as a mean for tumor treatment in health-care. The reliability of the particle accelerators becomes increasingly important for all these applications [2–4]. The accelerator reliability workshop series [5] has been started in 2002 to foster the exchange of knowledge, methods and experience to increase the reliability of particle accelerators.

Four workshops have been held by now. The workshop proved to be very useful to the community, but it also showed some limitations. While it served its purpose to exchange information about the reliability of particle accelerators, it failed to do so in a timely manner: most questions cannot wait for two years to be answered. The people attending these workshop had the expertise to help with generic problems of accelerator reliability, but the more specific the questions get, the more difficult it was to find appropriate answers. The number participants of a workshop is limited and the costs to send people to participate is often not affordable to small size accelerator institutions.

We aim to overcome these restrictions by creating an additional, fast communication channel that is not restricted in size. We've therefore decided to create an Internet forum on accelerator reliability, to allow fast communication: a question posted in Europe may get answered over night from the US. A forum is practically unlimited in the size of the community. And it allows people to subscribe to their topics of interest.

## MOTIVATION TO CHOOSE A FORUM

There are many fold ways to achieve a fast communication channel today. Mailing list, newsgroups, forums

and social network groups are all designed to facilitate the quick exchange of information world-wide. But there are differences between these methods.

A mailing list and newsgroups always address all people of the group. This works well for homogeneous groups, where most questions are relevant for a majority of the members. In our case we want to have subsystem experts to participate in our communication: an expert on RF reliability is often not interested in the reliability of software or beam instrumentation. It would discourage those experts from subscribing to the mailing list if they would get too many emails about topics that are fully out of their scope. A forum on the other hand provides the option to only subscribe to your topics of interest. A forum allows you to define categories and sub-forums where people can subscribe to. It provides the possibility to browse the former contributions before subscribing to any and it allows the user full control over their subscriptions. A social network group has similar features, but it is more complex and does not inherently provide categories of topics.

## FORUM STRUCTURE

We've selected forumotion.com [7], a free forum server for the forum software from phpBB [8]. The forum is structured in four categories, containing a total of 27 sub-forums. Figure 1 shows the home page of the forum. We've kept the structure simple. This eases navigation between the different topics and allows for a quick overview. We therefore intentionally only used four categories and within these we created sub-forums. In a sub-forum one can post new topics or reply to existing topics.

The four categories have the following purpose

- ***THIS FORUM!***

Questions about the usage of the forum and suggestions on how to improve it should be posted in the sub-forums under this category.

- ***CONFERENCES / WORKSHOPS***

Announcements of Accelerator Reliability Workshops (ARW) [5] or of the related Workshop on Accelerator Operation (WAO) [6] will be made in the sub-forums of this category, including links to the workshop web-pages. Questions and suggestions related to these workshops can be posted here as well and summaries of highlights of these workshops, too. An additional sub-forum is meant for references to other workshops related to accelerator reliability.

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THIS FORUM !	TOPICS	POSTS	LAST POSTS
<b>THIS FORUM !</b> Please bring here all your suggestions to improve this forum	3	6	Mon Mar 24, 2014 1:54 am <b>TonyMowbray</b>

  

CONFERENCES / WORKSHOPS	TOPICS	POSTS	LAST POSTS
<b>CONFERENCES / WORKSHOPS</b> Link to present, previous and future workshops. POST here your SUGGESTIONS for future workshops.	9	11	Wed Mar 19, 2014 4:37 pm <b>AndreasLuedeke</b>

  

ACCELERATOR RELIABILITY	TOPICS	POSTS	LAST POSTS
<b>ACCELERATOR RELIABILITY</b> Here you should post topics that either are related to the whole accelerator or to reliability theory (failures predictions, statistical methods, etc)	6	11	Sun May 12, 2013 11:59 pm <b>TonyMowbray</b>

  

SPECIFIC ACCELERATOR EQUIPMENT RELIABILITY	TOPICS	POSTS	LAST POSTS
<b>SPECIFIC ACCELERATOR EQUIPMENT RELIABILITY</b> Here you post topics that deal with the reliability of certain subsystems of an accelerator. The range goes from reliability of water pumps to control system reliability.	4	5	Fri Feb 25, 2011 11:50 pm <b>Cherrill Spencer</b>

Figure 1: Home page of the particle accelerator reliability forum

### • ACCELERATOR RELIABILITY

This category contains several sub-forums related to the whole accelerator. There are sub-categories ranging from reliability theory to general topics like radiation damages.

### • SPECIFIC ACCELERATOR EQUIPMENT RELIABILITY

The sub-forums related to specific equipment used to run an accelerator are in this category. If you are interested in the reliability of control systems, beam instrumentation or magnets then you'll find the corresponding sub-forums here.

## BASIC FORUM USAGE

The usage of the forum is very simple. One can just browse through the existing sub-forums and read all topics without prerequisites. The forum features to list all new topics since the last visit or to list all topics that have not been answered yet.

In order to submit topics one needs to register. Registration only requires you to provide a valid e-mail address

and can be done in less than a minute. After registration you can immediately post new topics and reply to existing topics.

In order to post a topic one chooses a category and a sub-forum. Spend a moment to consider if your topic is really new or rather strongly related to an existing topic. In the latter case you should reply to the existing topic, otherwise you create a new topic in the selected sub-forum. In any case you should select an appropriate topic title, that clearly highlights what you are posting about. A clear and unambiguous title increases the likelihood to get relevant answers. Keep your post as short as possible while providing all necessary information to the reader for a meaningful answer. If you need to provide background information you can add links to your web page and provide this information there.

You reply to a post either to answer questions or to provide references to sources that may provide answers. You can as well ask questions to better understand the problem. Moderators - privileged users with the power to edit other peoples posts, and to move or close topics - will take care of inappropriate posts; you can flag these posts to draw the attention of a moderator to the post.

If you post a topic it'll be added to your watch-list. All replies to the topic will be send to you by email. But if you find a topic that interests you, you can add it manually to your watch-list by selecting "Watch this topic for replies".

The feature "Start watching forum" allows you to receive all posts of a sub-forum by email. We recommend this feature for people with a special interest in the subject of the sub-forum. For example RF-experts should watch the sub-forum RF and will then receive all posts in that forum as email. This will facilitate a fast communication between experts. The user can always revert the choice by selecting "Stop watching forum".

The category "THIS FORUM !" should be used in case of questions, problems or suggestions related to the usage of the forum.

## DISCUSSION & OUTLOOK

An on-line forum is not a tool that can be used in itself. It becomes a useful tool if it is used by many people who share the same interest in accelerator reliability. Therefore we need to make it known and convince people to post their problems and watch the specific forums they are interested in. Only if the forum is used by many people, if information and experience is shared, if questions are asked and answered, only then it becomes a useful tool to enhance accelerator reliability worldwide.

The organizer of the ARW series therefore intend to advertise the usage of the forum and to convince as many people as possible to participate actively.

Please do register and spread the word! Please watch the sub-forums of interest to you! Please post your questions and answer to posts, if you have something to say! The success of this forum relies on the participation of you: the experts on accelerator reliability.

## APPENDIX

The particle accelerator reliability forum is structured in four categories, containing a total of 27 sub-forums.

- **THIS FORUM !**
  - Suggestions to improve this forum
  - Usage Questions, Remarks, etc.
- **CONFERENCES / WORKSHOPS**
  - WAO: Workshop on Accelerator Operation
  - ARW: Accelerator Reliability Workshop
  - Other Workshops related to Accelerator Reliability
- **ACCELERATOR RELIABILITY**
  - Generalities
  - Theory
  - On-Line and Post-Mortem Diagnostics Tools
  - Helper Tools for Failure Analysis (Communication tools, Alarm-Systems)
  - Equipment Aging Issues

- Water Related Problems (corrosion, copper oxyde production, radiolysis, etc)
- Damages due to Radiation - Special Materials
- **SPECIFIC ACCELERATOR EQUIPMENT RELIABILITY**
  - Beam Instrumentation / Diagnostics
  - Control Systems
  - Cryogenics
  - Electronics
  - Electrostatical devices
  - Infrastructure (buildings)
  - Injection & Extraction Elements
  - Magnets
  - Radio Frequency
  - Power Supplies / Power Converters
  - Safety Systems - Interlock Systems - Run Permit Systems
  - Software
  - Stripping Foils
  - Vacuum Systems
  - Water Cooling Equipment (pumps, flowmeters, pipes, ...)

## REFERENCES

- [1] The Particle Accelerator Reliability Forum: <http://reliability.forumotion.com>
- [2] A. Luedeke, M. Bieler, M. Pont, J.F. Lamarre, "The Common Operation Metrics Initiative for 3rd Generation Light Sources", IPAC'14, MOOCB02, in this proceedings
- [3] A. Luedeke, "Finding Your Happy-User-Index", IPAC'14, THPRI024, these proceedings
- [4] F.J. Willeke, "Designing and Running for High Accelerator Availability", PAC'09, Vancouver, May 2009, WE1RAI03
- [5] Accelerator Reliability Workshop home page: <https://sites.google.com/site/particleacceleratorreliability>
- [6] Workshop on Accelerator Operation home page: <http://www-opsws.fnal.gov>
- [7] Home page: <http://www.forumotion.com>
- [8] phpBB.com home page: <https://www.phpbb.com>
- [9] Rules of Netiquette in the Wikipedia: [http://en.wikipedia.org/wiki/Etiquette\\_in\\_technology](http://en.wikipedia.org/wiki/Etiquette_in_technology)