

Reliability

- Overview
- Definitions
- Horizontal View
- Spirited Discussions

Overview

- Obvious importance
 - No performance factor (Luminosity, vertex length, lifetime) will yield more benefit to the bottom line than reliability
- Major challenge
 - The low-hanging fruit is soon gone
 - The hard job is to see beyond broken hardware
 - We must examine not only how well the hardware works but also how well we *use* the hardware

The term “reliability”

- Natural definition
 - A hindsight concept
 - Doesn't address quality of hours
 - Doesn't lead us to a path to improvement
- A better view of the term emphasizes the *rely*
 - Rely connotes depending on it being there when you need it
 - ...”depend on your Sears Diehard battery in February”...

$$\textit{reliability} = \frac{\textit{hours _ delivered}}{\textit{hours _ promised}}$$

*“America’s reliance on
foreign oil”*

The term “reproducibility”

- Reproducibility: to do the same thing over and over and over again
 - Not a trivial accomplishment, but...
 - We *never* do this
- Reliability comes from being able to change parameter x and still parameter y reproduces
 - This is the higher bar that we should pursue
 - Hence this session is organized with the *horizontal* view

The Horizontal View

- Defer to the experts (power supplies, rf, controls, etc.) for the vertical view
 - Summaries of plans are presented
 - We all need to know what's happening in the machine
 - What will be different
- In this session we try to exploit our three years of experience to improve the way we get the best reliability out of the machine when it's not broken
 - Talks include
 - Reliability of tune/chromaticity, schedule, and machine physics
 - *Correlations* in reliability statistics
 - Think of reliability as a system in itself, not just the inevitable consequence of the assemblage of reliable components

Spirited Discussions

- I hope these talks stimulate some animated discussions, here and continuing
- I encourage the strategy of being provocative
- My own provocative proposal (for example...)
- The best thing we could do to improve reliability is to equip the machine with reference magnets
- We regulate current, but the beam responds to magnetic field
- The connection between the two is **unreliable**