Status of Opto-Board Production

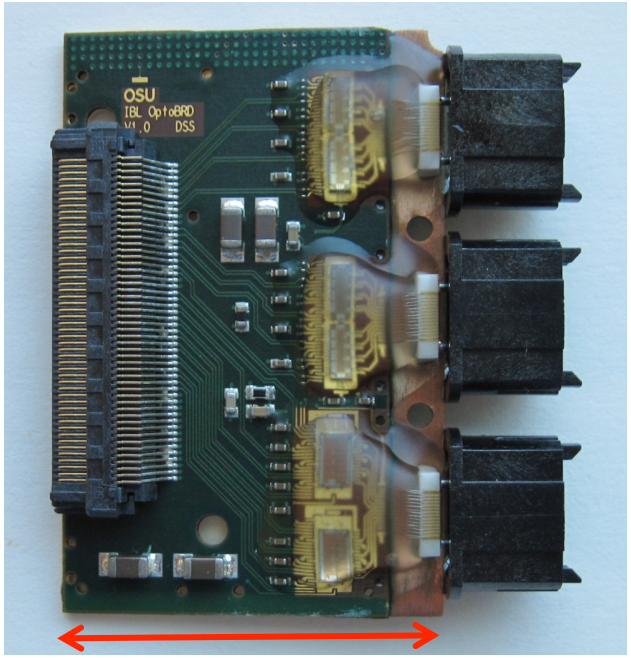
K.K. Gan, R. Ishmukhametov, H. Kagan, R.D. Kass,
K. Looper, J. Moss, J. Moore, S. Smith, B. Tannenwald, Y. Yang
The Ohio State University

P. Buchholz, M. Ziolkowski
Universität Siegen

February 19, 2014

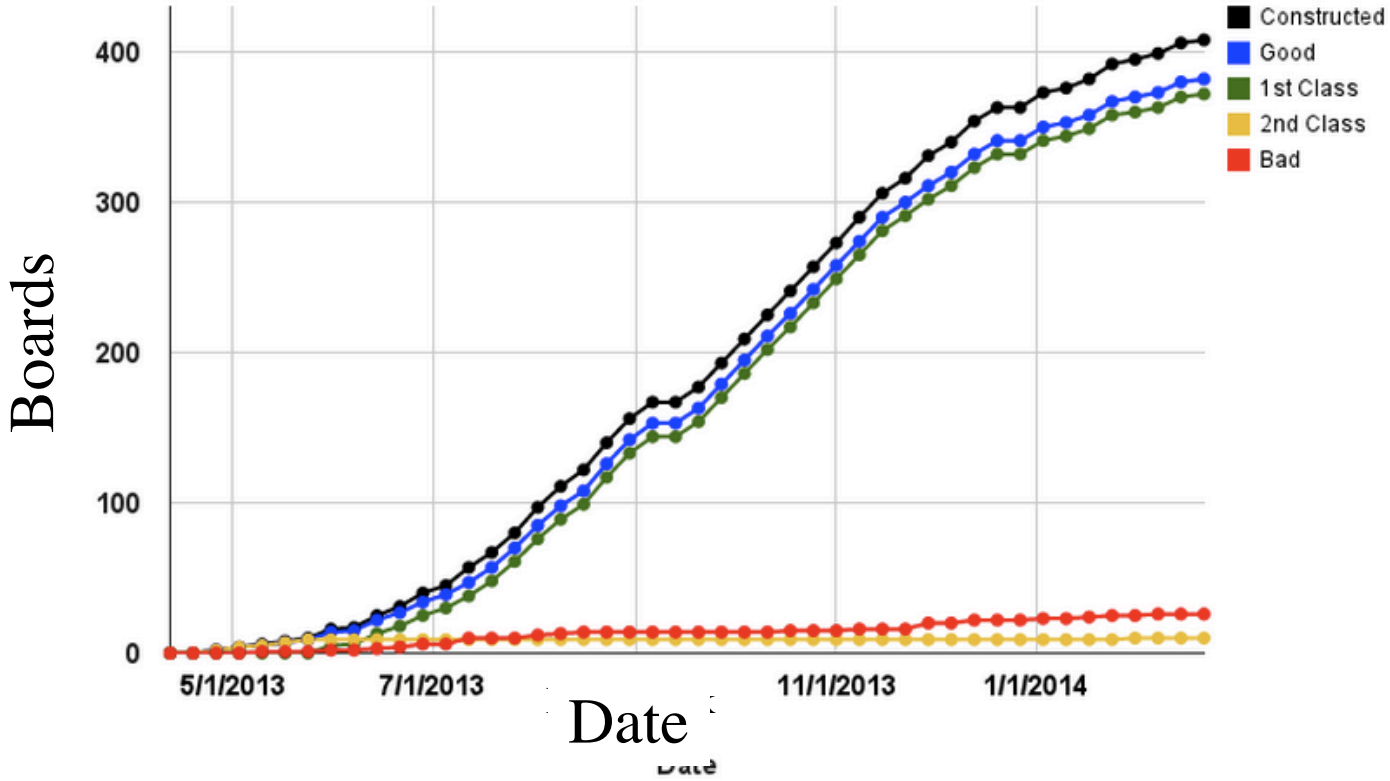
Introduction

- 3 opto-board flavors
  - nSQP D opto-board (disk, L1, L2): 7 TTC + 14 data links
  - nSQP B opto-board (B-layer): 7 TTC + 14 data links
  - IBL opto-board: 8 TTC + 16 data links

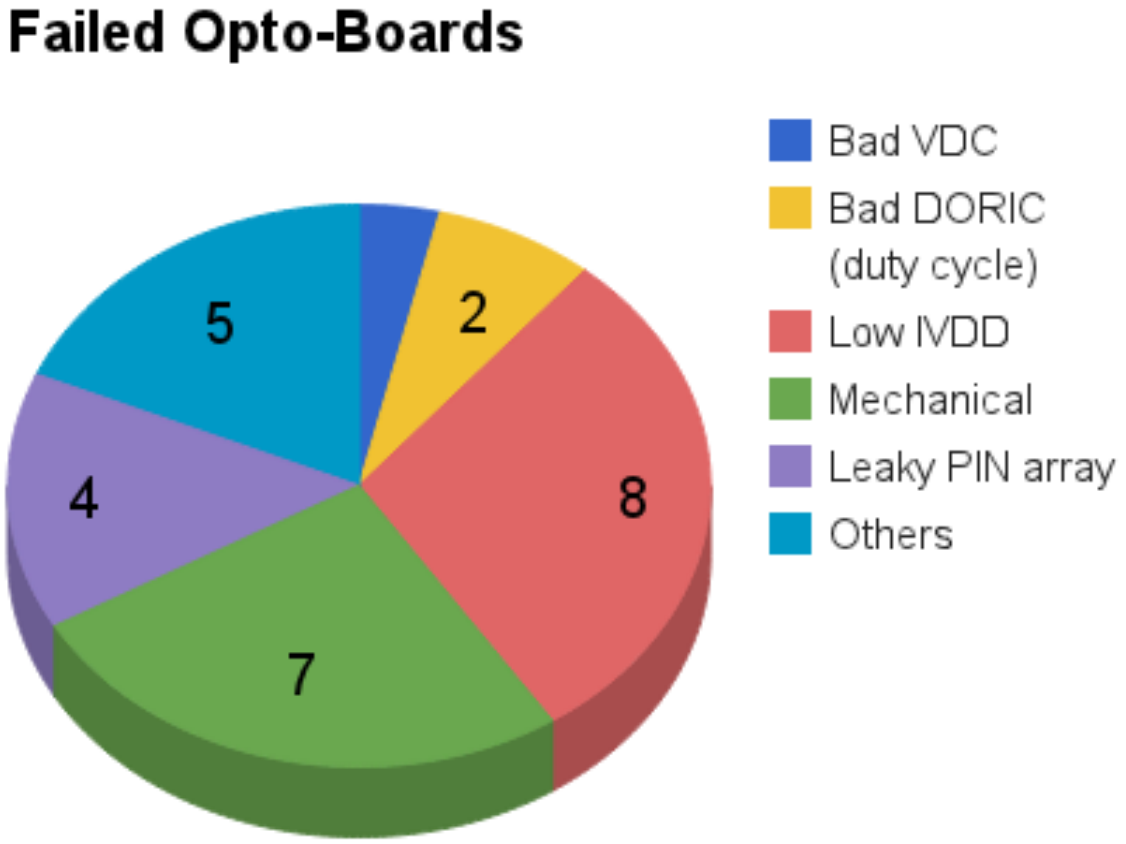


Production Status

- Total fabricated: 417
  - Good: 382 (1st class: 372, 2nd class: 10)
  - Bad: 26
- To be QA'ed: 9
- To be wire bonded/QA'ed: 4 B + 3 D



Summary of Failed Boards

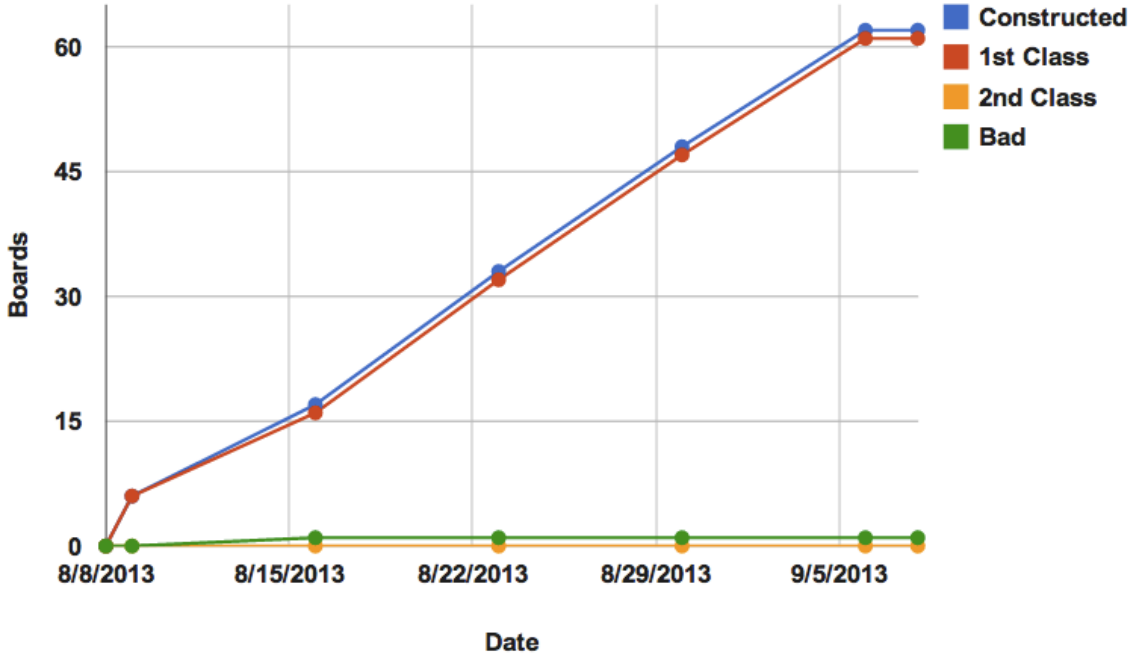


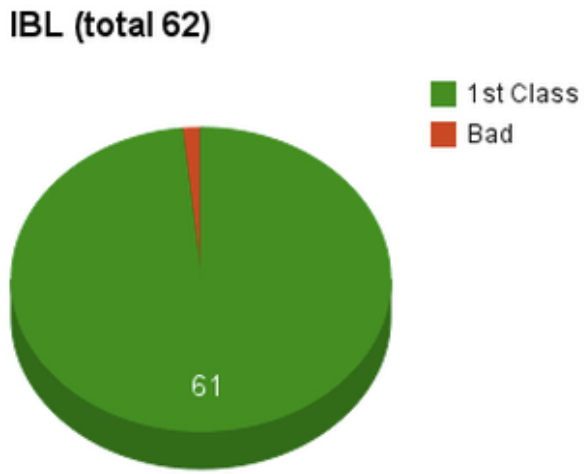
Problematic Epoxy

- Detachment of MPO connectors
  on several boards (< 10) early in the production
- 22 boards used epoxy with different color
  - replace all MPO connectors
    - 30 insertion tests performed on 40 connectors before removal
      - 10 insertion tests during QA
      - no connector detached after 40 insertion tests
      - expect no detachment under normal operation
  - 19 boards successfully recovered

IBL Board Status

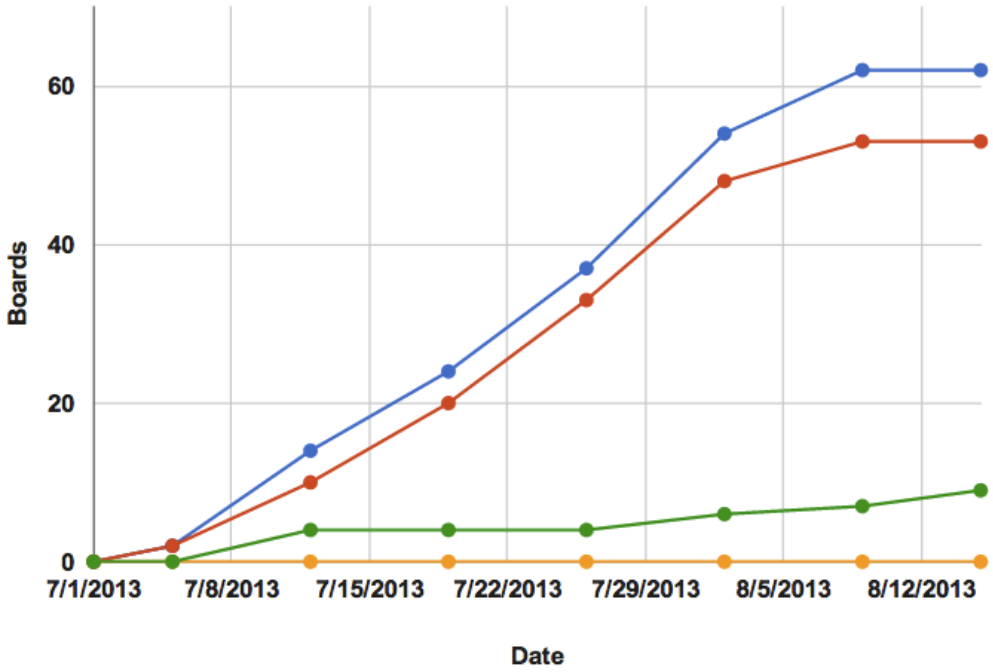
- Good: 47+14 (DBM+AFP)
- Needed: 28
- Spare: 15
- 85/85 test: 2
- 50/50 test: 2
- All boards at CERN passed CERN reception test

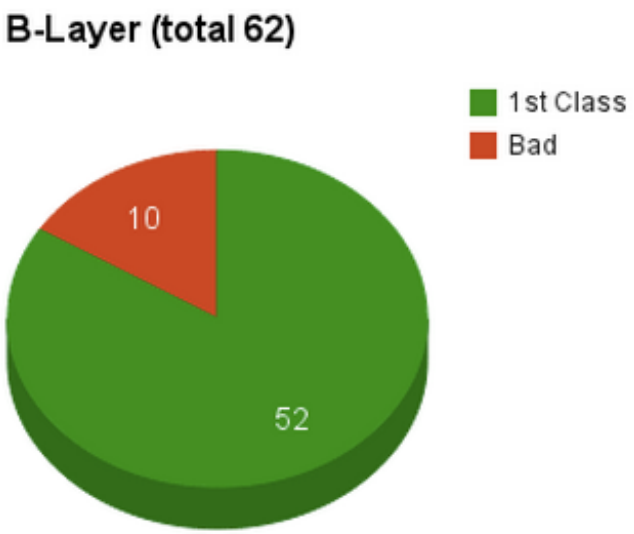




B Board Status

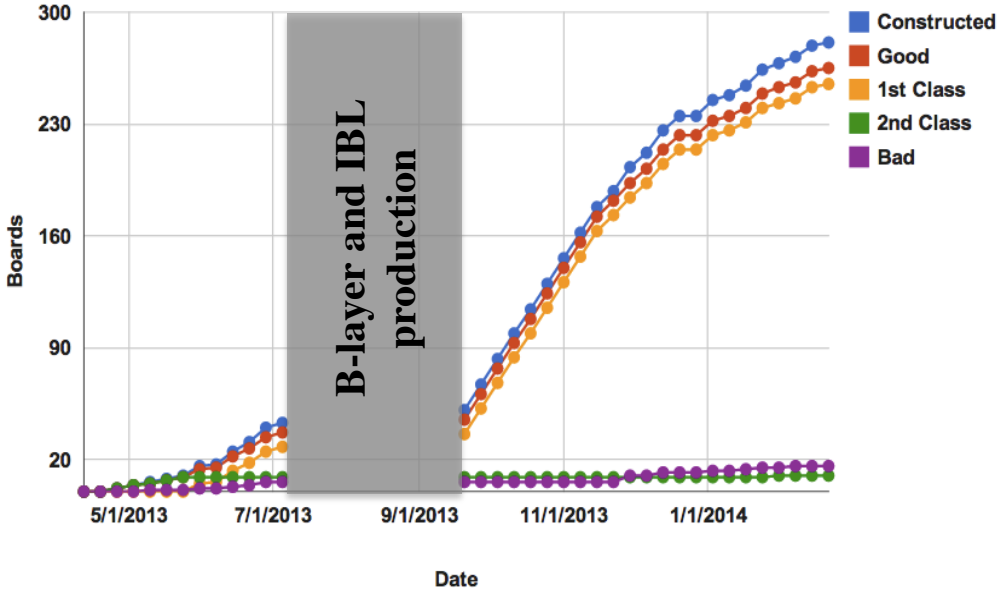
- Good: 52
- To be wire bonded/QA'ed: 4
- Needed: 44
- Spare: 6+4
- 85/85 test: 1
- 50/50 test: 1
- All boards at CERN passed CERN reception test

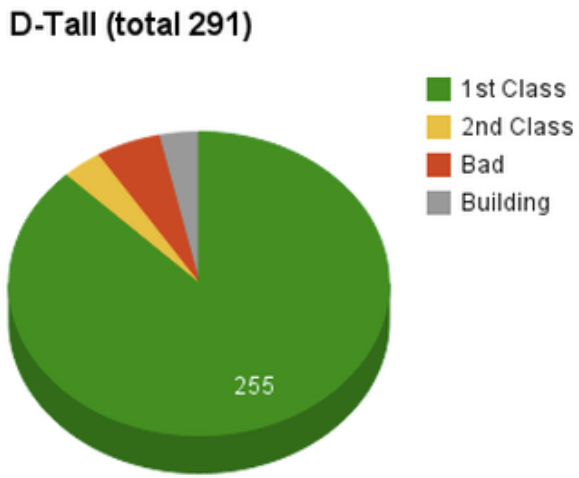




D Board Status

- Good: 265
- To be QA'ed: 9
- To be wire bonded/QA'ed: 3
- Needed: 228
- Spare: 43
- 85/85 test: 3
- 50/50 test: 3
- All boards at CERN passed CERN reception test





Stress Test on Opto-Boards

- Industry standard: opto-boards should survive for 1,000 hours at 85°C/85% relative humidity
- Started the test on two IBL boards
  - D and B boards will be added in the next weeks
- After 2,000 hours, repeat the test on new boards at 50/50 for months

Extended Burn-In

- Few of the 400 boards have problems after burn-in/thermal cycles:
  - 1 VDC
  - 8 VCSEL arrays have low power
  - 4 leaky PIN arrays
  - ⇨ must keep opto-boards powered to weed out infant morality

Summary

- IBL boards production completed and delivered
- Build 4 more spare B boards this week
- Complete fabrication of spare D boards this week