

Progress Report

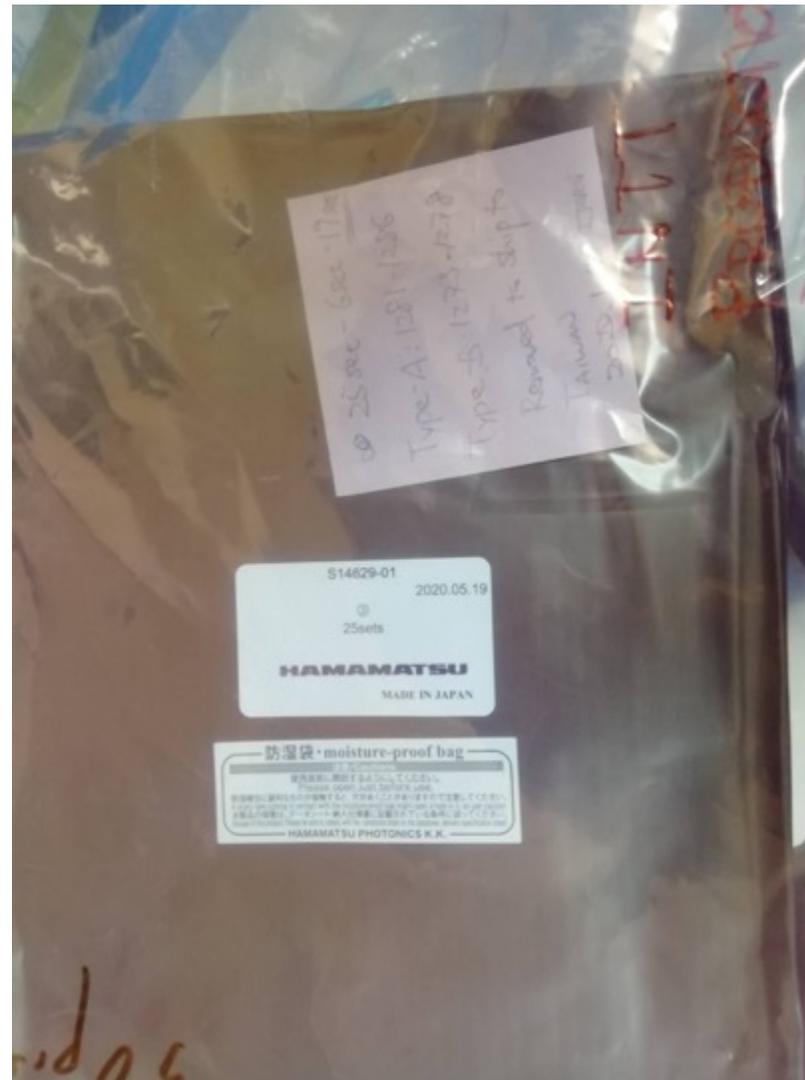
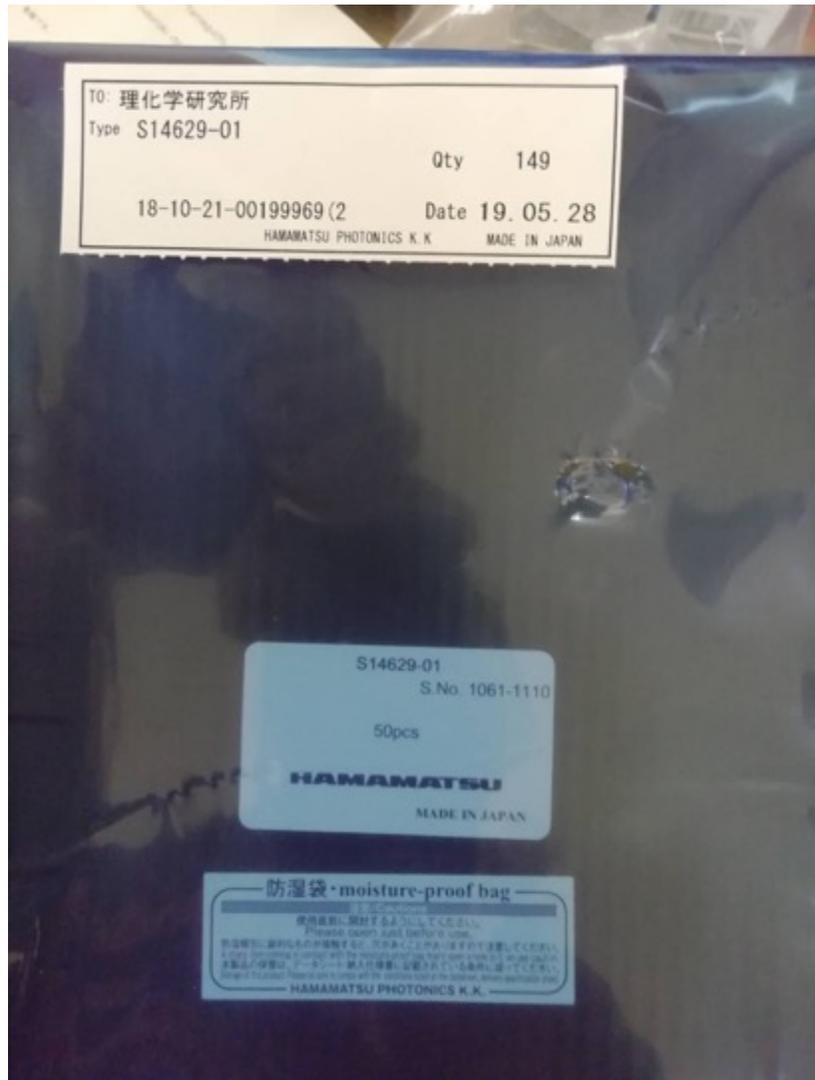
RIKEN/RBRC

Itaru Nakagawa

Table of Contents

- Silicon Shipping to BNL
- Source test fixture
- 1008 ROC Test
- Batch-2 Stave Status

Silicon Sensor Shipping to BNL



50 + 16 sets were shipped to BNL.

Package was picked up on March 9th.

HDI Export to BNL

ID	Production	Delivery	Shipping Destination
1 ~ 59	Batch-1A	2020/4/23	Taiwan 19 in June,2020 + 1 in Nov.2020 BNL 40 in June,2020
60 ~ 180	Batch-1B	2020/7/31	60 ~ 79 Taiwan in Nov.2020 80 ~ 84 Hayashi REPIC co. in Dec.2020 100,101,110,111,148~180 BNL in Dec.2020
181 ~ 270	Batch-2	2020/10/29	181 ~ 244 BNL in Dec.,2020 245 ~ 246 Taiwan in Nov.,2020

Location	March 9, 2021	To be shipped**	Total
BNL	140	25	165
Taiwan	41	44	85
RIKEN	69*		

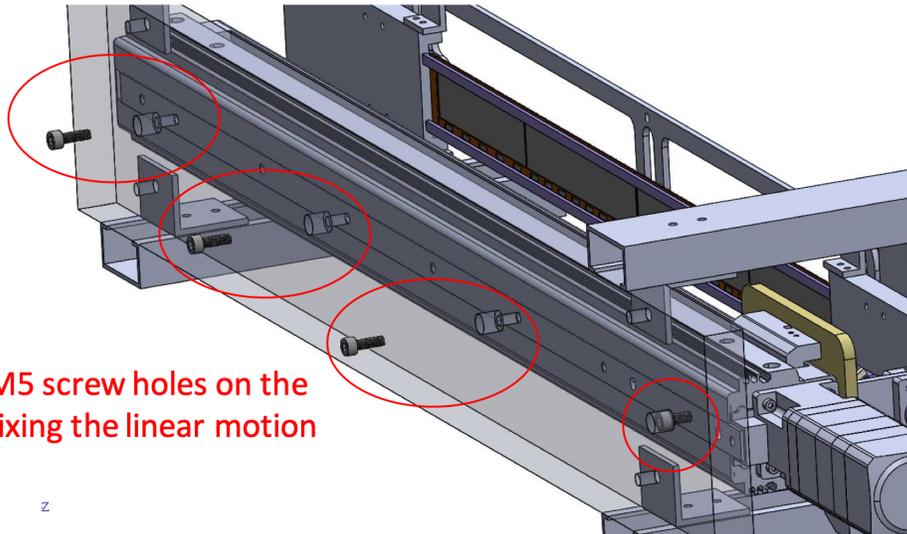
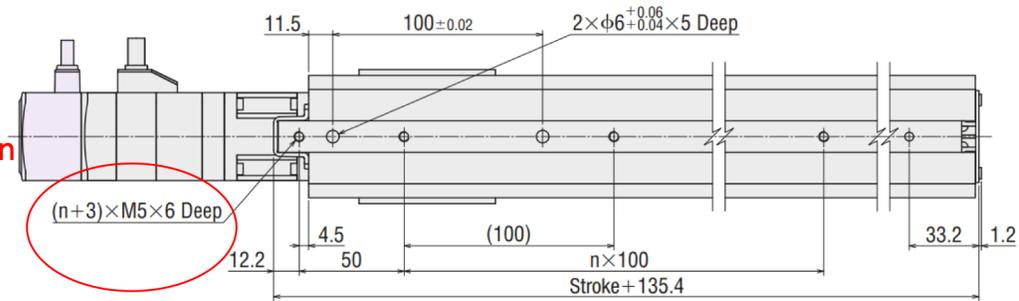
* 65 HDIs from Batch-1B (Same batch with Module-70)

** I would like to pend shipping for next couple of weeks until we are informed from Yamashita regarding thru hole issue.

Source Test Fixture

Base_fixture_ver4_0305

There are several M5 screw holes on the backside of the linear motion system, so we can use the existing M5 screw holes



Added the four M5 screw holes on the base fixture for fixing the linear motion system

Han-Sheng updated after the last INTT meeting. The latest design is posted in wiki.

1008 ROC Test

1008 ROC Status

- List of ROCs already disassembled from the big wheel

			2020/3/6
INTT ROC ID	9	10	11
FVTX ROC ID	SW	SW	27
Location on Sept. 28, 2020	Taiwan	Taiwan	
Location on Oct. 20, 2020	NWU		BNL? NWU?

Total 24 ROCs in the big wheel.

3 ROCs are already in Japan/Taiwan

21 ROCs are to be removed from the big wheel.

However, still all 24 ROCs are to be tested in the same condition.

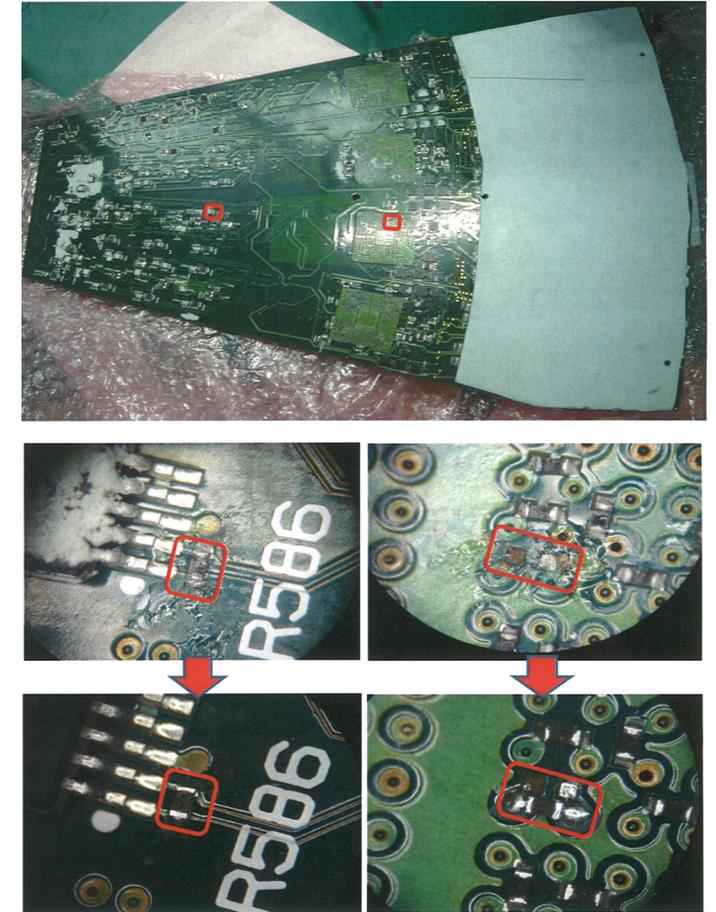
INTT use is 16 ROCs.

1008 ROC Test Procedures

1. Visibly check surface components. List any suspicious/broken chips.
2. DF18 connectors may need microscope inspection.
3. Connect with a good full INTT setup to DF18 ports one by one.
4. Connect bias lines (need T-joint) and apply 100V, record drawing current.
5. Download test bench FPGA codes for a calibration.
6. Run calibration and check if there is any issues.
7. Scan all DF18 ports for station-1,2,3, excluding station-0.
8. Keep all records in a ROC database.

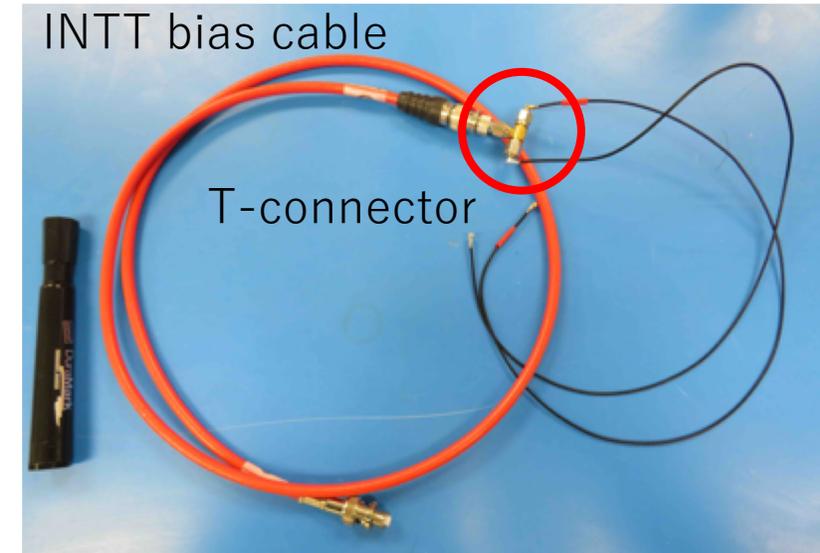
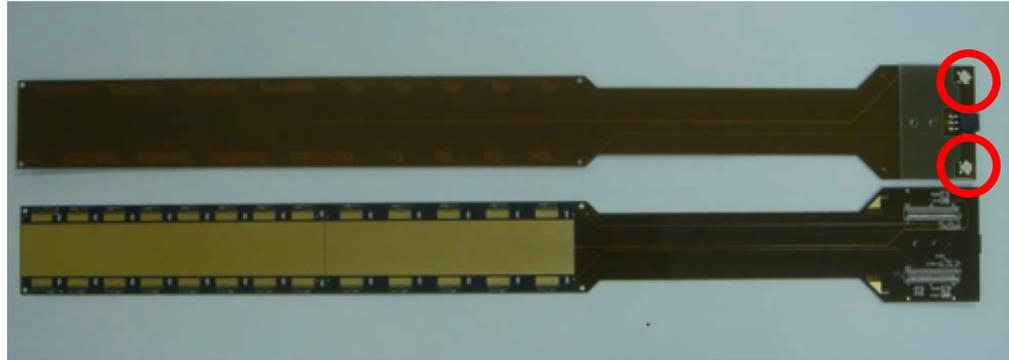
3 ~ 4 ROC's/day/person (Total 2 weeks).

ROC components repair in 2019

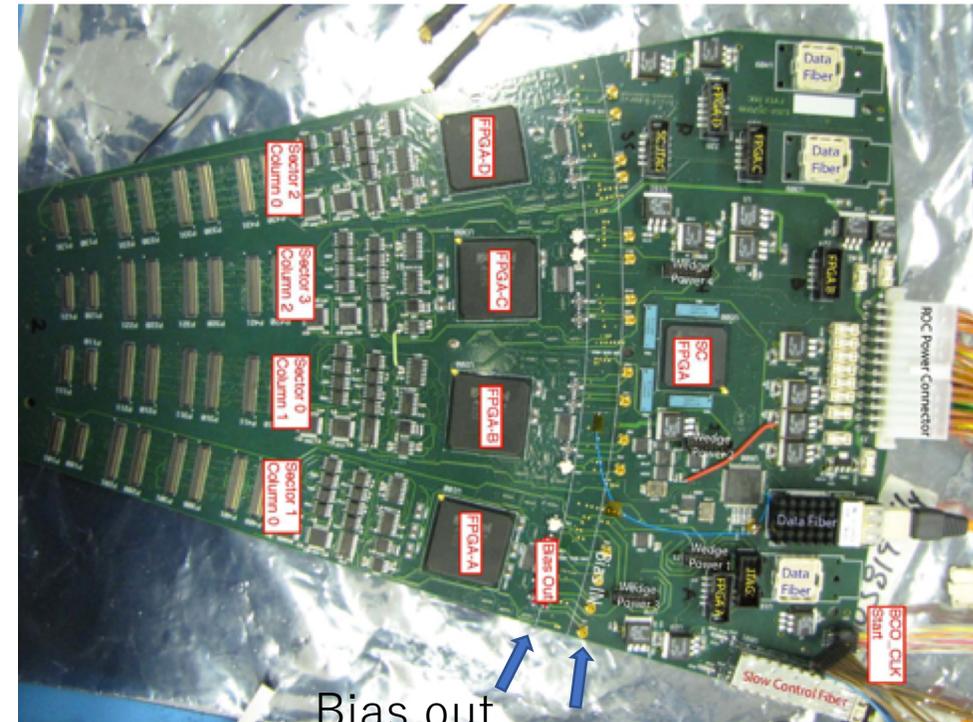


Bias Current Measurement

INTT (2 bias connectors/HDI)

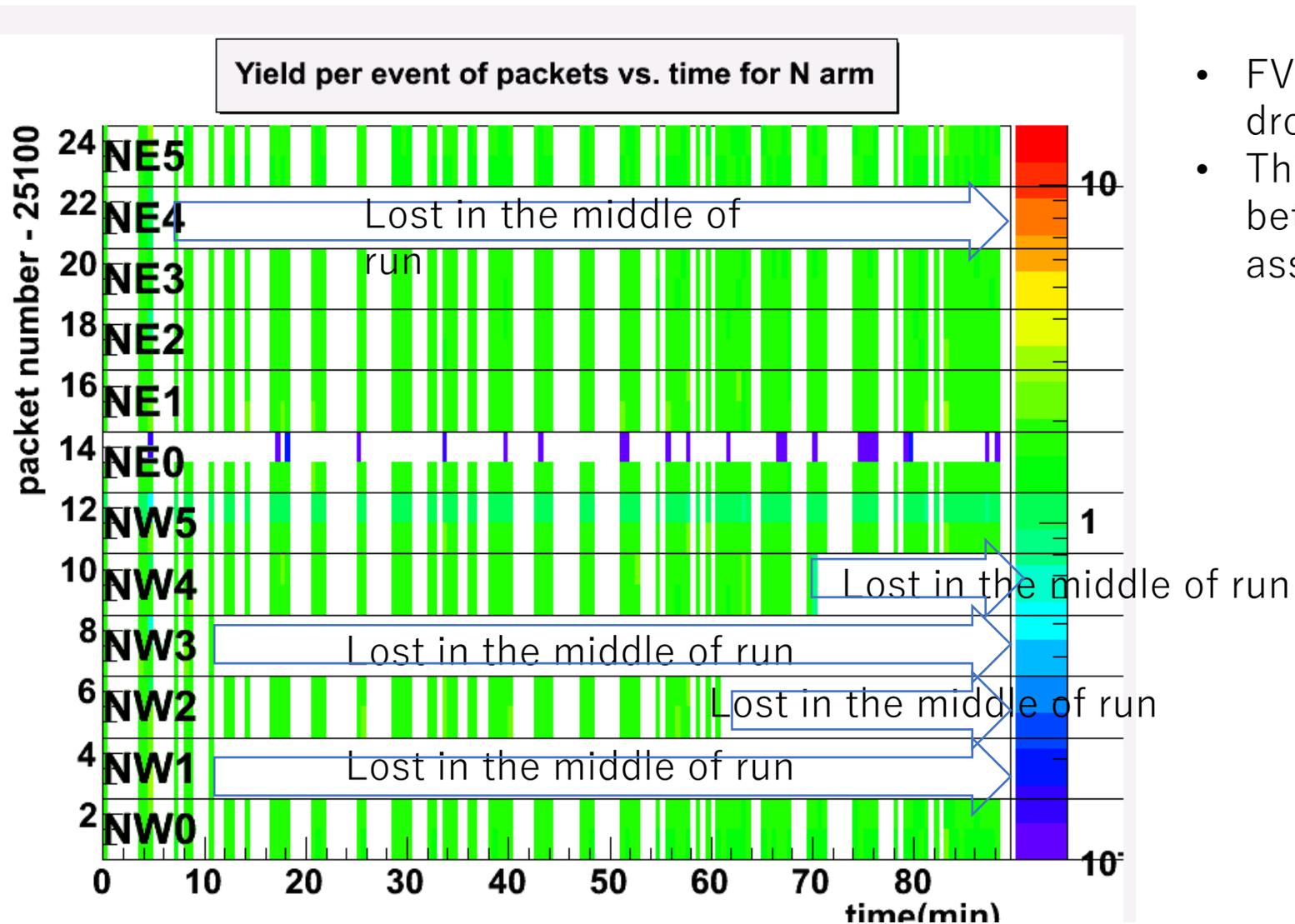


FVTX (1 bias connector/HDI)



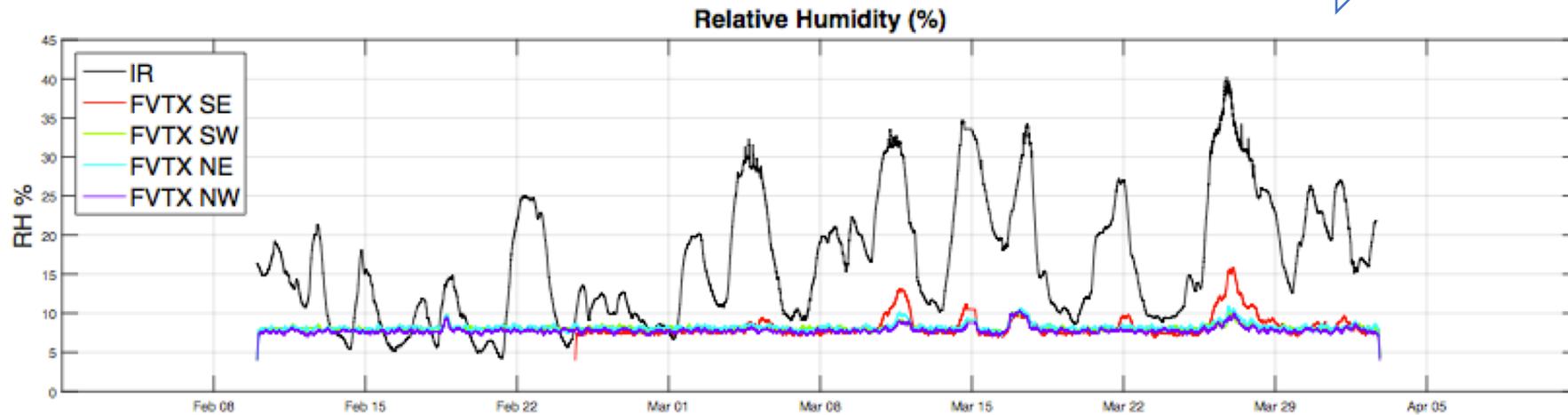
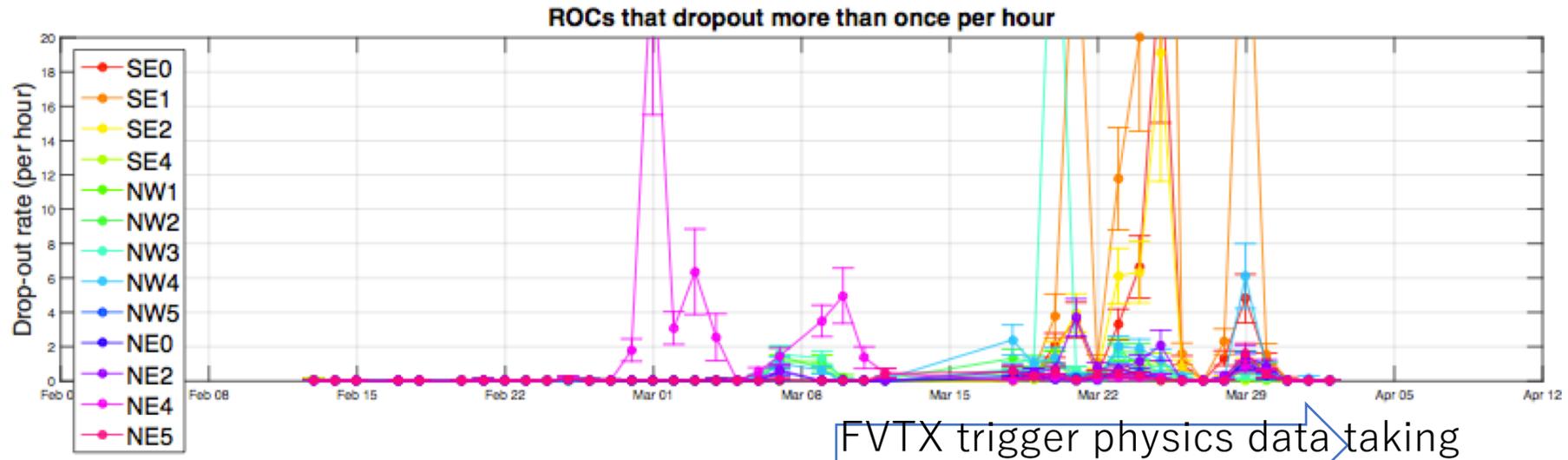
Make sure the bias connectors in ROC don't add extra currents to the bias power.

FVTX Packet Drop Off Issue



- FVTX was suffered from sudden packet drop off in the middle of data taking.
- This problem remain unresolved, so we better keep track of ROC-ID and assigned FVTX packet number (f.i. NE5).

Prospect of packet drop out



May be correlated with the humidity. The drop out may be quenched towards later Run15.

Repair Work

- Any port which has anomaly found in testing may be further investigated. Make a decision whether DF18 connector is to be replaced.
- Outsourcing the regulator replacements and repair damaged/missing components. (~ 1 month).
- Once the ROC is repaired, we should repeat the test again.

COVID-19

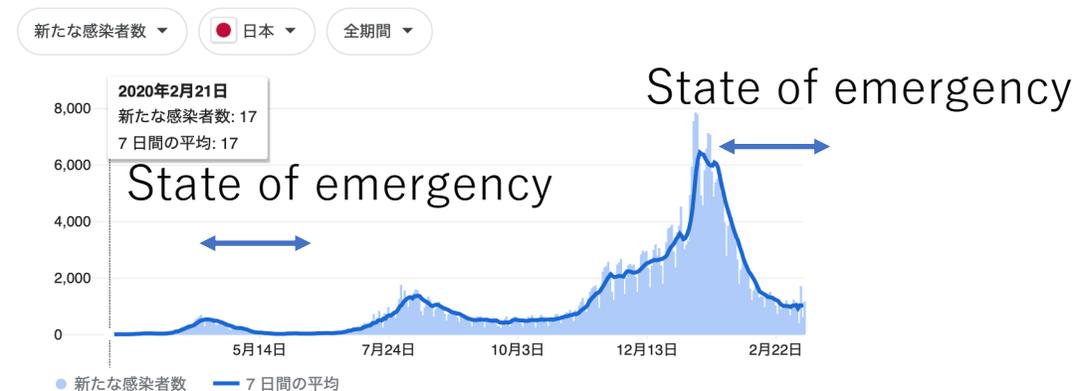
- Assuming Vaccine intake is mandatory to make an international travel.
- According to the vaccination schedule in Japan, to be completed for seniors by the end of June.
- For 16 years old or elder the opportunity will be later than July to fall, 2021.
- I am afraid we better not count to send Japanese students to BNL in this Summer.

Time	Target Group
Mid-February	Priority vaccinations of health care professionals (Between 10,000 and 20,000)
March	Other health care professionals (About 4 million)
Late March	Start of mailing out of vaccination forms (Starting with senior citizens)
April and beyond	Senior citizens (65 and older, about 36 million) People with pre-existing conditions (About 8.2 million) Workers at elderly care facilities, etc. ◀ Some may be vaccinated earlier (About 2 million) Those between 60 and 64 ◀ Depending on availability of vaccines (About 7.5 million)
?	Wider vaccinations depending on availability of vaccines

Based on health ministry documents distributed to local governments and explanations by government officials

Man Power in RIKEN

- Staff : Itaru, Genki
- Rikkyo Univeristy Students : Hikaru Imai (Freshman) + 2 Undergraduates.
- Occasional help from NWU (domestic travel may be constrained by the state of emergencies.)



Conclusion

- The amount of works is estimated to be completed within 2 weeks or so by a dedicated personnel. Two people would definitely be a help for sure to supplement the concentration.
- If we perform the test in BNL, we may have to wait until the ladder assembly is completed, since the ROC test will occupy the standalone DAQ.
- As long as a dedicated student from Perdue can stay in BNL this Summer, it may be doable.
- The advantage of performing the test in RIKEN is that we can start testing in middle of April to May.

Batch-2 Stave Status

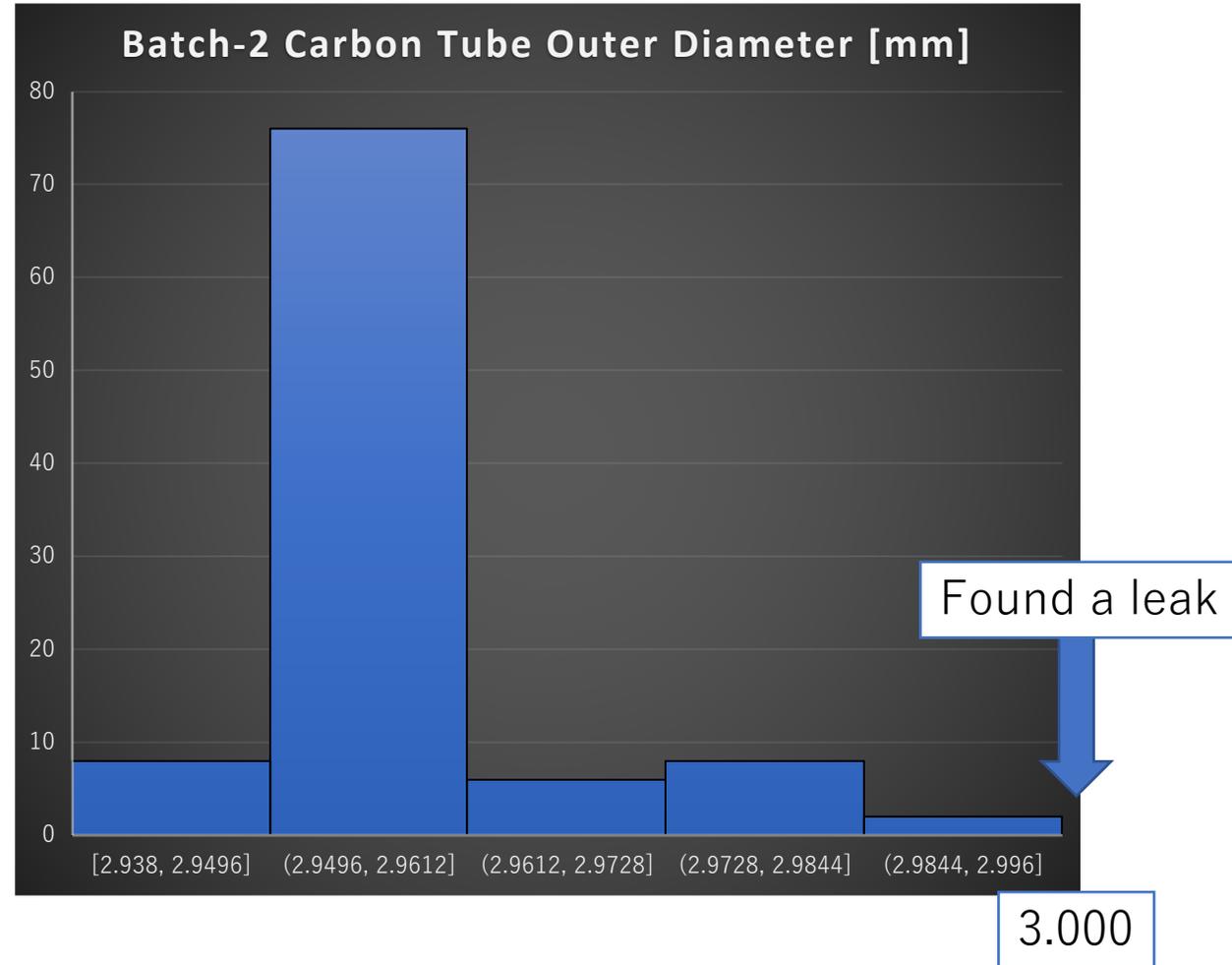
Status

- Asuka co. completed assembly and 2nd round leak tests after the assembly by now.
- Itaru received the QA data from Asuka and the data are evaluated to select good 75 staves to be delivered.
 - Data was posted [<https://wiki.bnl.gov/sPHENIX/index.php/Staff>]
- Waiting for our selection of good staves and plastic tubes for transportation.
- Bad news is they found 3~4 staves did not pass the leak test requirement after the assembly.

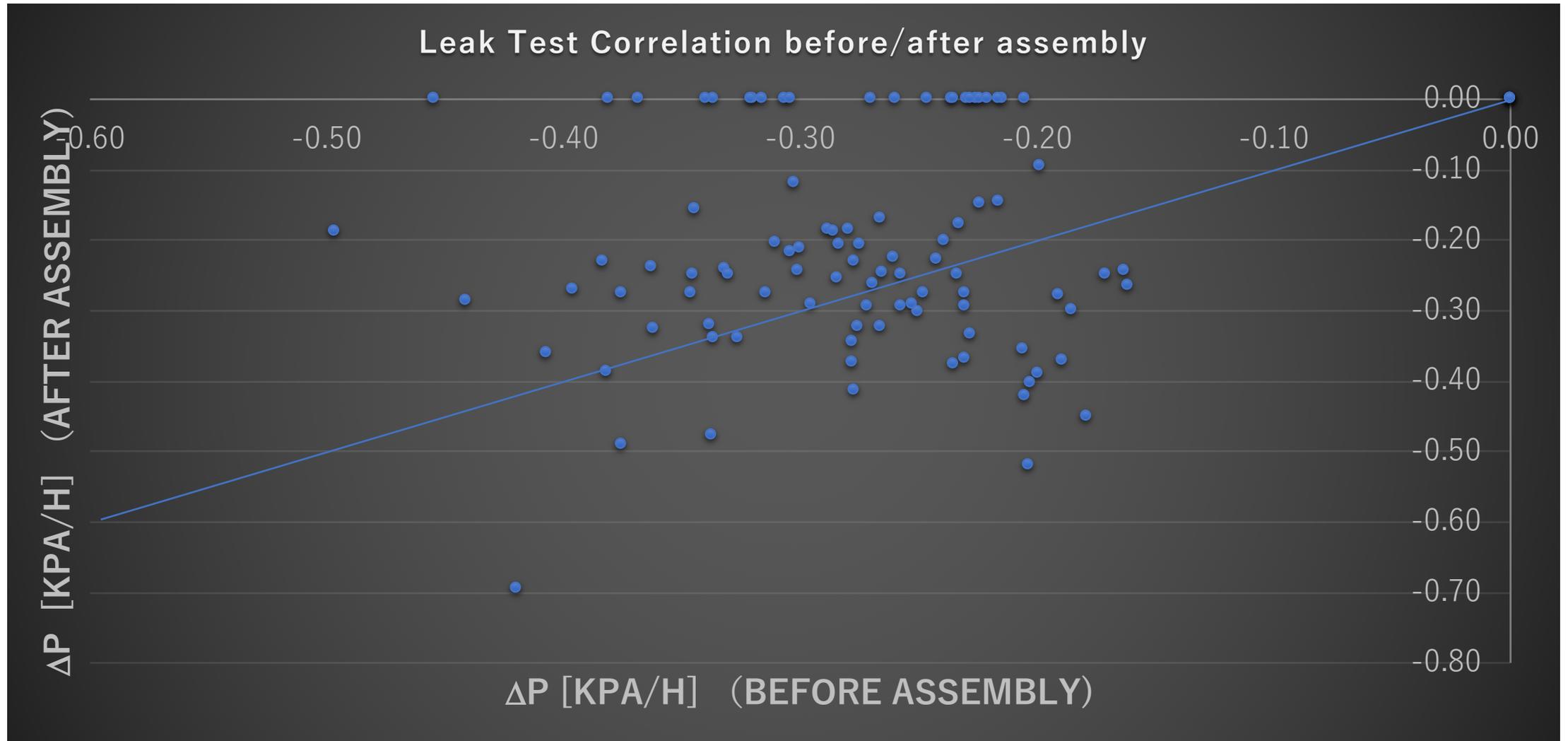
Leak Issue

- Batch-2 tube diameters are all less than 2.996.
- We found a leak for the 3.000 tube in BNL.
- Is the 2.996 tube safe enough?
- Unfortunately, we have no record of tube diameter for batch-2 staves.
- We don't know what is the diameter of leaking tubes
- New leaks after assembly implies the cause in the CFRP plates and end cap assemblies after 1st test.
- They are preparing to test heat cycle ($+40^{\circ}\text{C} \sim 0 \pm 5^{\circ}\text{C}$) effect due to the heat expansion constant difference in different materials of a staff.

Further investigation is necessary.

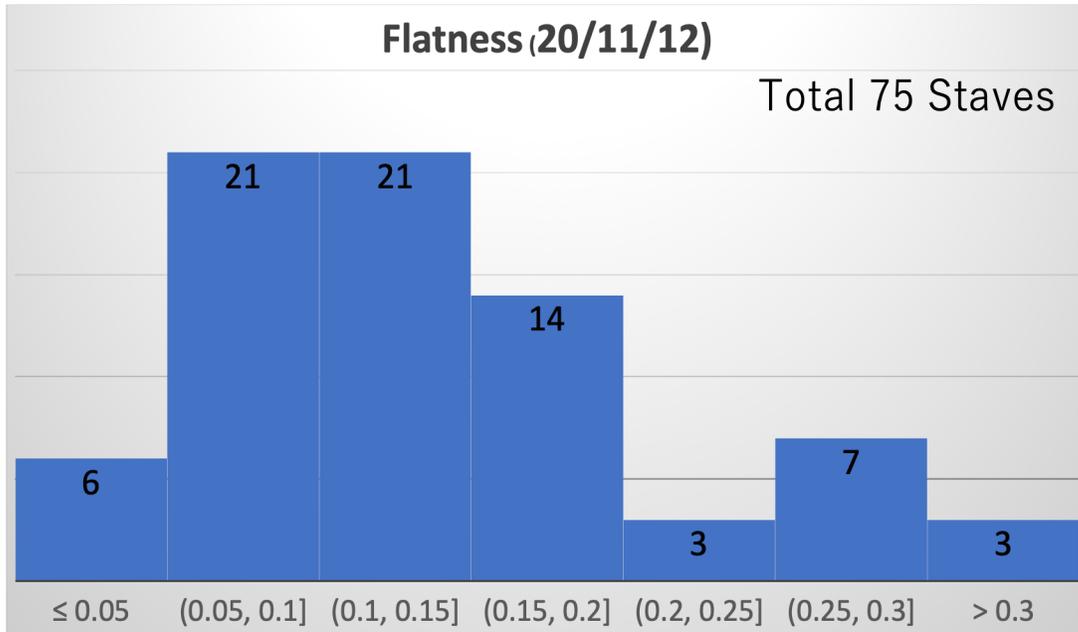


Leak Test Before/After Assembly

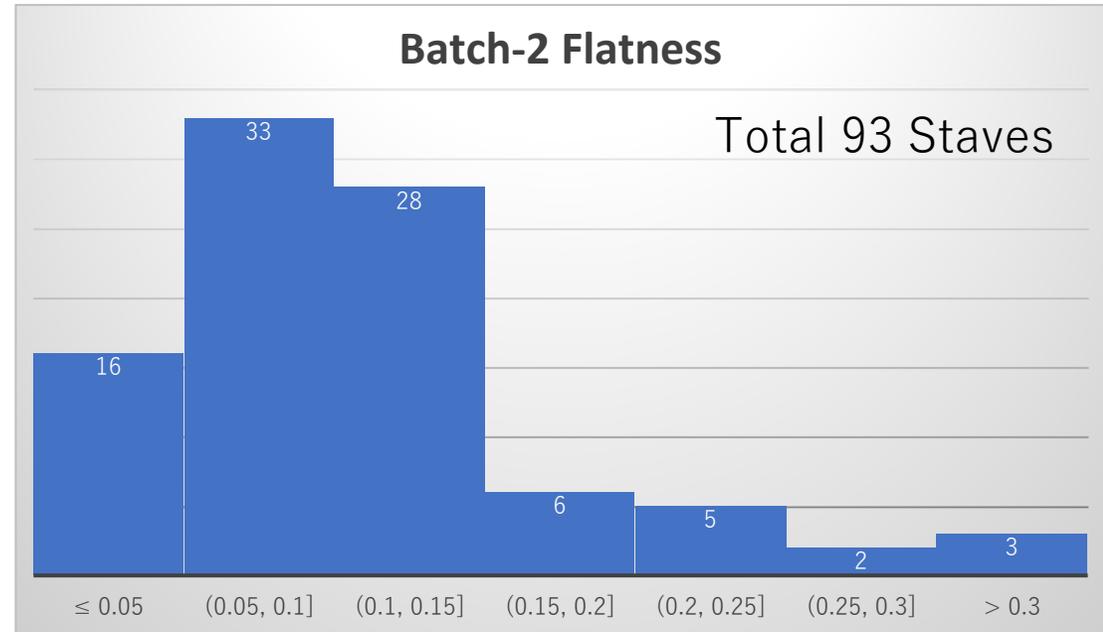


Although tubes are the same, but the correlations are not necessarily clear as one anticipate. 19

Flatness Comparison Batch-1 vs Batch-2



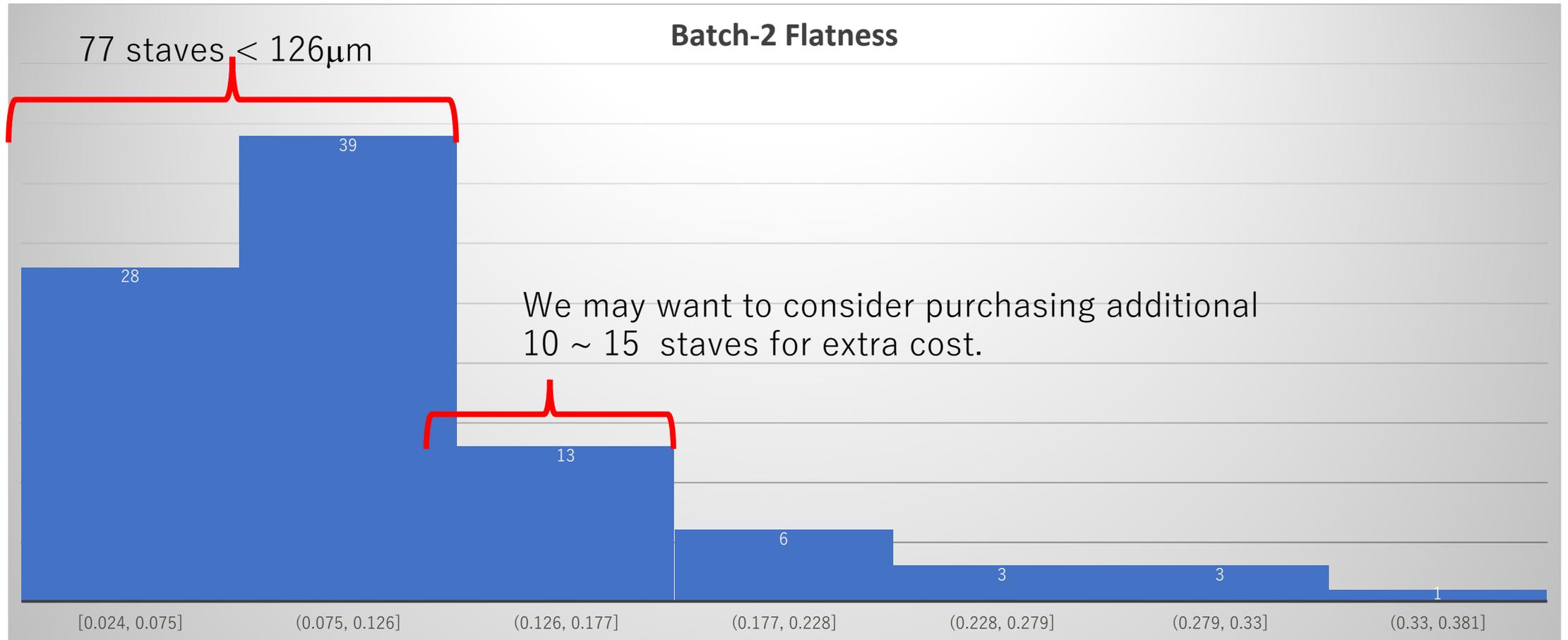
27/75 staves (36%) achieved <100um



49/93 (56%) staves achieved <100um

Certainly the flatness is improved in batch-2 compared to batch-1 stave assembly.

Batch-2 Stave Flatness



Batch-2 Stave Conclusion

- Batch-2 staves are completed assembly and ready for shipping.
- Waiting for plastic tubes for transportation.
- Asuka found 3~4 tubes leak after the assembly.
- This implies possible damage in the assembly procedure.
- There may be multiple cause of the leak in addition to the small space between SUS inner and carbon outer tube diameter difference.
- Further investigation is ongoing.

Back up

Taiwan Shipping

- 200um sensors (Type-A x 6 + Type-B x 6) are to be picked up on March 5th.
- Silicon sensors to BNL
- HDI's to BNL

Silicon Sensors

- 150 sets are delivered to RIKEN by the end of May.
- Datasheet CD is handed to Kai-Yu. He will upload data to the database.
- 129 sets + 2 bad sensor sets are shipped to NCU for testing
- 20 sets + 2 bad sensor sets are shipped to BNL
- 1 set is already in assembly process in REPIC.co as a 2nd test module for Nara test bench. To be delivered by the end of July.
- Another 150 sets is in preparation for the procurement in JFY2019.

Silicon Sensors

- Silicon sensors are to be exported to BNL
 - 50 sets from 1st batch + 25 sets from 2nd batch (Untested)
 - To be pick up on Nov.25th
- 56 sets silicon sensors are to be shipped to Taiwan
 - 29 sets from 1st batch are already in Taiwan.
 - 51 sets + 5 sets spares = 56 sets from 2nd batch for 40 ladders assembly in Taiwan
 - 18 sets (20% of total 90 sets from 2nd batch) are to be QA tested.

Silicon Shipping History

- 2019/7 20 sets to BNL (1st batch)
- 2020/11 50 + 25 sets to BNL (50 from batch1 + 25 from batch-2)
- 2019/7 50 + 50 + 29 sets (1st batch) to NCU
- 2020/4 29 sets (1st batch) to NCU
- 2020/12 50 + 6 sets (2nd batch) to NCU
- 2021/3 50 + 16 sets to BNL