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Nb sheet production and future prospects

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Agenda

1. High-purity Nb sheet production for European XFEL project.
2. Estimation of Nb sheet production capacity for ILC project.

Nb for Euro XFEL Project

- Tokyo Denkai tendered an offer for 5,886 high-purity Nb sheets of 265 x 265 x 2.8 mm.
- This quantity is as 50% of half cell material of SC cavity of the European XFEL project .
- We won the bid and our offer was completely accepted.

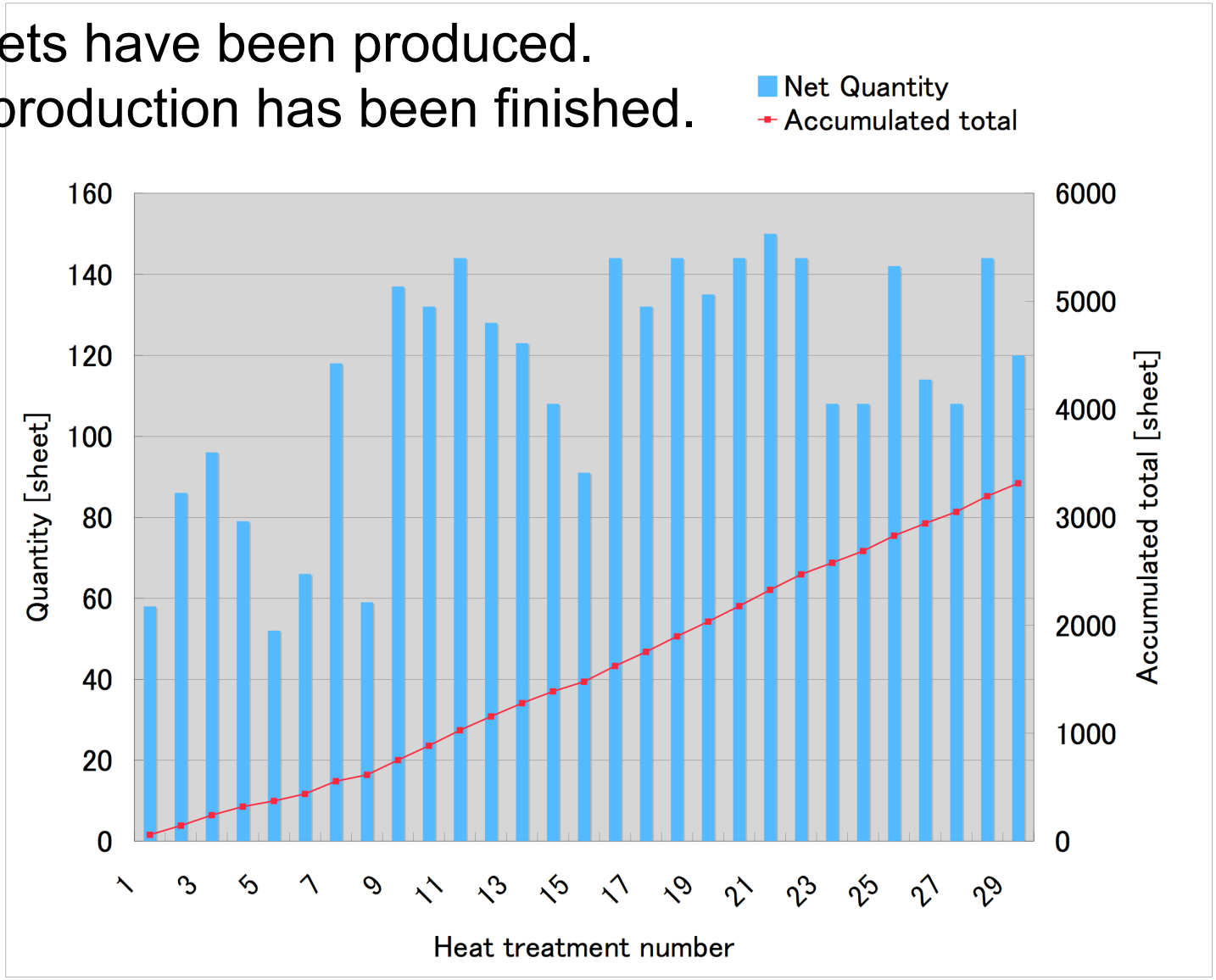
Shipping schedule

We received the official order on January 7, 2011.

Shipping time	Shipping quantity	Total quantity	Percentage	Weight [kg]
28-Mar-11	1,000	1,000	17%	1,685
11-May-11	472	1,472	25%	795
10-Nov-11	1,472	2,944	50%	2,480
11-May-12	1,471	4,415	75%	2,479
12-Nov-12	1,471	5,886	100%	2,479
				9,919

Production rate

3,314 sheets have been produced.
56.3% of production has been finished.



Secret Tools

- To reduce Nb sheet production time, we installed two new types of machines.
  - Automatic Buffing (polishing) Machine
    - For final sheets
    - For thick sheets
  - Automatic Etching Machine

Automatic buffing machine (ABM)

Before ABM installation

Automatic Etching Machine

2. Estimation of Nb production capability for ILC project.

Estimation of capacity

- Prof. Yamamoto, Project Manager of Global Design Effort, asked us to estimate Nb production capacity and cost.
- We estimated the same on the basis of actual on-going high-purity Nb production for the European XFEL project and submitted the estimated results.

Quantity of half cells

- 16,000 9-cell cavities.
- 16,000 × 9 × 2 = 288,000 half cells.
- 300 × 300 × 2.8 mm: 2,167 g
- 265 × 265 × 2.8 mm: 1,685 g

Percentage	number of sheets	Weight [ton]
100%	288,000	485
50%	144,000	243
20%	57,600	97
50% of XFEL	5,886	10

Production rate

- January 7, 2011 → Order received.
- November 12, 2012 → Final delivery.
  - 5,886 sheets/1 year 9 months
  - 6,000 sheets/1.5 years
  - 4,000 sheets/year

Estimate of capacity

- 6,000 high-purity Nb sheets can be produced in 1.5 years.

Production time	As affairs stand	
1.5 years	6,000	2.1%
5 years	20,000	6.9%
7 years	28,000	9.7%

Estimate of capacity

- If production capacity is tripled,

Production time	Tripleed production capacity	
1.5 year	18,000	6.3%
5 years	60,000	20.8%
7 years	84,000	29.2%

- We can produce 84,000 sheets of half cell material in 7 years.

Why triple?

- Tokyo Denkai has 7 EB Melting Furnaces.
- Two furnaces are currently used to melt Nb.
- When all furnaces are used for melting Nb, the production capacity will be tripled.

Preconditions

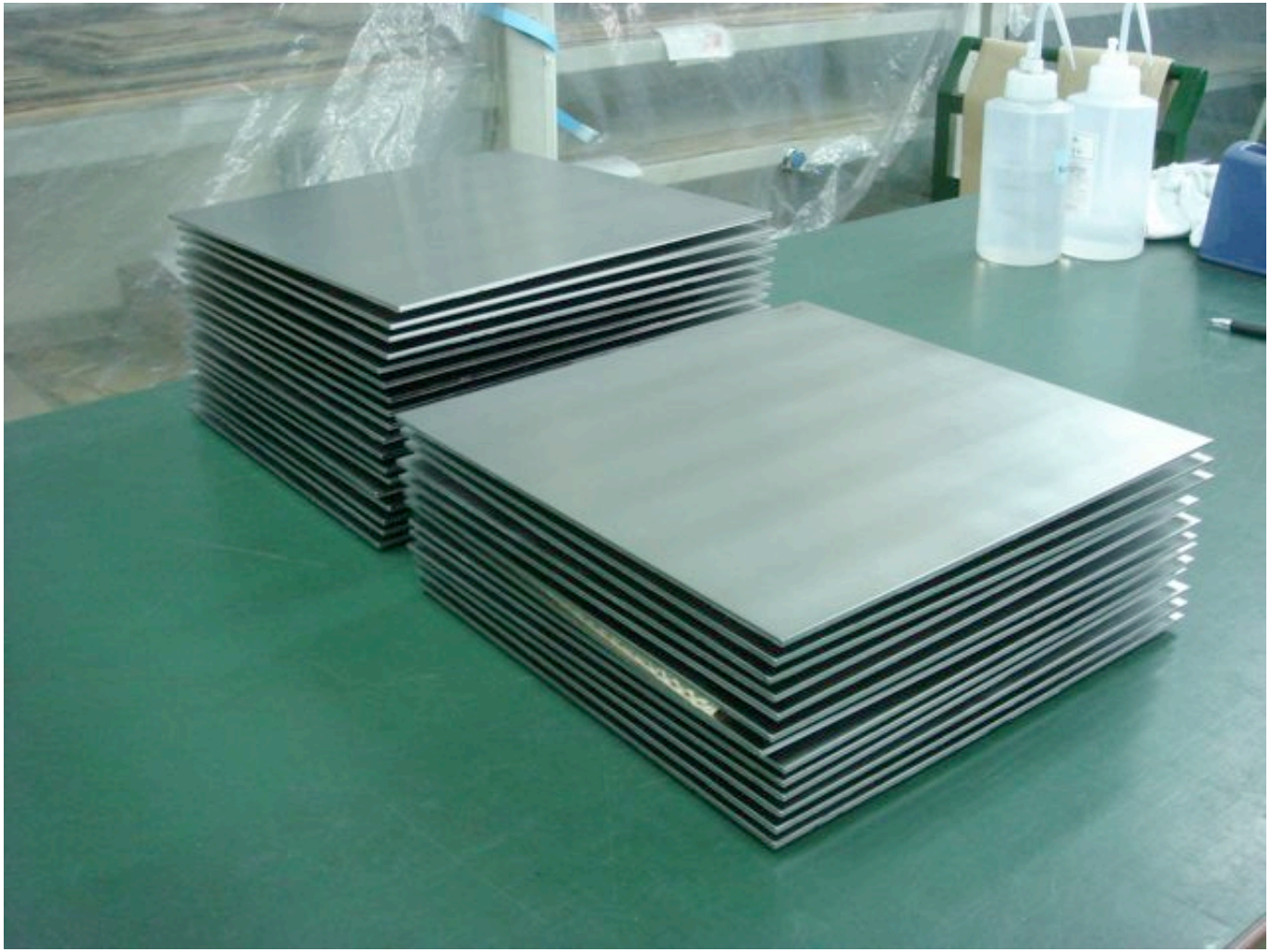
- To estimate the Nb production capacity, following conditions are prerequisite:
  - Continuous supply of sufficient raw material (Nb ingots) to Tokyo Denkai.
  - Stable electric power supply.

Summary

- Tokyo Denkai Co., Ltd. tendered an order for 5,886 Nb sheets as half cell material for the European XFEL project.
- The contractual final delivery date is November 2012.
- However, the production rate is faster than the scheduled rate.
- New machines and our workers' efforts are responsible for this excellent production rate.

Summary

- The ILC project required 288,000 half cells.
- The production rate for Nb sheets (265 × 265 × 2.8 mm) is approximately 4,000 sheets/year.
- If the production period is 7 years, Tokyo Denkai can supply 28,000 (9.7%) Nb sheets.
- Tokyo Denkai has the melting capacity thrice that of the existing Nb production process. Therefore, Tokyo Denkai can supply 84,000 sheets, i.e., 29.4%, for the ILC half cells in 7 years.



Thank you for your attention.