Chapter 8　Instrument Development Core

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1. Introduction

Instrument Development Core was inaugurated on April 1, 2000, and five years passed on March 31, 2005. This is a progress report on the activity in the 2004 fiscal year followed by the last report.

2. Objective and Operation

This Core mainly manufactures instruments and samples based on requests from the researchers in IMR and supports materials research, having instrument development technologies meeting the needs, with close relationships with the researchers,

Accordingly, we use equipment (numerical control unit) with many functions, etc. to improve in efficiency and to carry out the jobs flexibly and quickly. Furthermore, in the Laboratory Workshop, there is a full-time instructor always on hand. He teaches "workmanship" to the researchers and tries to give the joy of creation to young researchers.

The main operations are as follows.

a) Designing and manufacturing instruments and developing special apparatus.
b) Developing special technologies to prepare samples.
c) Technical support and advice for researchers, etc. on designing instruments and preparing samples.
d) Technical support and assistance for researchers, etc. on designing instruments and sample preparation.
e) Technical support for research projects.

3. Education Activities

In this Core, the following technical education is given to the researchers, the graduate school students, etc.

a) Technical consultation

Held on a steady basis in order to technically support instrument design, machining and making a research plan, and to accommodate the Core users.

b) Machining seminar

Given to those who machine simple parts for the instruments, repair, create samples, etc. by themselves. This seminar has been a regular event since 1973, and obtained approval from the Faculty Meeting. It opens at the end of June to the beginning of July every year as follows, and issues a certificate to the participants.

(1) Purpose: Facilitate the use of the Laboratory Workshop aiming at acquiring elementary machining techniques.
(2) Subjects: Mechanical drawing, machining [lathe, shaper, miller, and drill press (finish)], TIG welding
(3) Participants: Graduate school students and researchers in IMR
(4) Instructor: Core staff member

4. Request and Use

The requests in this Core are shown in Table 1.

	(FY 2003)			**FY 2004**		
	Staff members	Graduate students/ researchers	Total	Staff members	Graduate students/ researchers	Total
Machining slips	328	328	656	**344**	**280**	**624**
Machining hours	6,682	5,612	12,294	**7,072**	**3,232**	**10,304**

Table 1 Slips issued for marching and hours used for machining

Next, Table 2 shows the use of the Laboratory Workshop by researchers, graduate students, etc.

	(FY 2003)		**FY 2004**	
	Users	Hours	Users	Hours
Lathe	384	569	**338**	**558**
Shaper	76	197	**64**	**162**
Miller	368	1,100	**328**	**854**
High-speed cutting machine	151	368	**290**	**598**
Drill press	164	149	**163**	**149**
Diamond saw	21	16	**25**	**18**
Other	171	195	**203**	**287**
Total	1,335	2,594	**1,461**	**2,625**

Table 2 Number of users and Hours of use for the Laboratory Workshop

5. Public Information and Enlightening Activities

When IMR was opened to the public in October 2004, we displayed performance, features, and processing examples of NC machine tools (lathe, miller, electric discharge machine), and demonstrated them.
Moreover, the number of visitors to this Core open house was 1,447, about 2.3 times the last time, and we produced 1,200 IMR original design plates for the IMR visitors as souvenirs, and 1,500 IMR original design kokeshi wooden dolls for the Core visitors. They were very popular among the visitors.

6. The Equipment

- Total number of apparatus (as of March, 2005): 86 units
- Breakdown
  - ○ Working normally: 57 units
  - ○ To be renewed due to performance degradation: 29 units

- Classification by year of purchase

Year of purchase	Number purchased	Description (No.)	
		Normal operation	To be renewed
1945-1954	4		4
1955-1964	4	1	3
1965-1974	20	4	16
1975-1984	21	15	6
1985-1994	19	19	
1995-2004	18	18	
Total	86	57	29