

# Chapter 3

## The Maintenance and Strengthening of Defense Production and Technological Bases, and the Effective, Efficient Acquisition of Defense Equipment

While the security environment surrounding Japan is becoming increasingly harsh, the situation concerning our nation's defense-related expenditure continues to be difficult. Amid this situation, it is vital to maintain and strengthen Japan's defense production and technological bases, while striving for the effective, efficient acquisition of defense equipment, in order to ensure the stable roll-out of such equipment, which is becoming increasingly high-performance and complex. This chapter explains the Ministry's initiatives in this area.

Chapter 3

The Maintenance and Strengthening of Defense Production and Technological Bases, and the Effective, Efficient Acquisition of Defense Equipment

### Section 1 Defense Production and Technological Bases, and the Current Status of Defense Equipment Acquisition

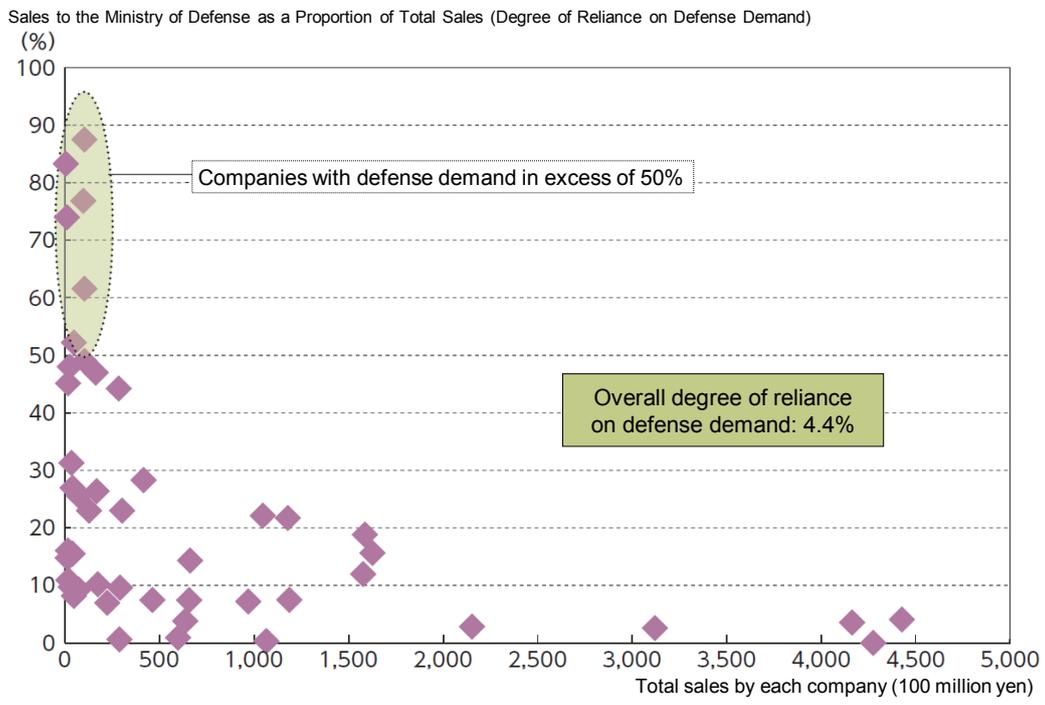
#### 1 Japan's Defense Production and Technological Bases

##### 1 The Attributes and Current Status of Japan's Defense Production and Technological Bases

The term "defense production and technological bases" refers to the human, physical and technological bases for development, production, operation, maintenance, remodeling, and re-

furbishment of defense equipment required for Ministry of Defense and SDF activities. As Japan has no national arsenal (state-owned munitions factory), the whole of the production base and most of the technological base is in the hands of companies that manufacture defense equipment and associated

**Fig. III-3-1-1** Scale of the Defense Industry in Japan and its Degree of Reliance on Defense Demand



Note: The distribution of degrees of reliance on defense demand among relevant companies (5-year average from 2003 to 2007) based on surveys conducted by the Ministry of Defense on 57 relevant companies

## Column

## Master Craftsmanship Ensuring the “Life” of Guns - Voices of the Production Front Supported by Specialized and Advanced Skills

Katsuhiko Sekiya, Director of the Firearms Department, Howa Machinery, Ltd.

Our company has been engaged in defense-related industry for about 80 years, from before World War II, and is the only rifle manufacturer in Japan.

The manufacturing of rifles is supported by workers with specialized and advanced skills. For example, the manufacturing process of rifles includes processes such as eliminating any distortion of the barrel, which is necessary to ensure targeting accuracy, which is extremely important in guns. This work cannot be done with a machine, and should be left to be carried out by hand. We are proud of the targeting accuracy of our products, which are at the highest level in the world, realized by the excellent skills of the workers which have been developed over many years.

Currently, the production front is striving to hand down those skills, in order to maintain and develop this process. However, this is not the kind of work that can be done by just anyone. Rather, it requires a certain level of “sense” on the worker’s part. The worker is required to identify which part of the barrel is distorted, and by how much by their own eyes, and to correct the distortion immediately. It takes more than five years to produce such a worker, and therefore it takes a long period of time to select the right workers and hand down skills to them.

Furthermore, besides the handing down of skills through OJT, our company places top priority on making sure that the workers are aware that they are playing a part in the defense of this country. We consider this to be most important for maintaining and developing skills, and will result in maintaining of the quality of our guns.



Worker engaged in eliminating distortion

items (the defense industry). Small and medium-sized enterprises (SMEs) are involved in the production of defense equipment; for example, there are said to be approximately 1,200 companies involved with fighter aircraft, approximately 1,300 involved with tanks, and approximately 2,500 involved with destroyers. Moreover, the market for defense equipment is limited to the small amount of demand from the Ministry of Defense, so manufacturing economies of scale cannot be expected. Furthermore, specialized, advanced technologies and skills are required in the development and manufacture of defense equipment, and it takes a great deal of effort to cultivate and maintain those technologies and skills.

Thus, the scale of Japan’s defense industry is not large, and the value of production destined for the Ministry of Defense accounts for less than 1% of the overall value of production in Japan. Moreover, the degree of reliance on defense sector demand (sales related to defense as a proportion of total sales by the company) among companies involved in the production of defense equipment and related items is around 4% on average, so for many companies, the defense business is not their main field of business. On the other hand, among the comparatively small-scale companies are some with a degree of reliance on defense sector demand in excess of 50%, so fluctuations in pro-

urement by the Ministry of Defense have a major impact on such companies.

(See Fig. III-3-1-1)

### 2 The Significance of Retaining Defense Production and Technological Bases Within Japan

Retaining such bases within Japan is significant because it ensures that the requisite number of items can be mobilized from among the items held, by making it easier to develop and produce equipment and materials adapted to the particular attributes of Japan’s terrain, and facilitating the effective, efficient equipment maintenance and upkeep, including responses in the event of an emergency. The maintenance of such bases is also significant in that it ensures bargaining power with other countries when procuring equipment and materials from abroad and when participating in international joint development and production. Furthermore, a ripple effect, which means domestic companies can apply new technologies acquired through the development of equipment and materials to civilian goods, can also be expected.

## 2 The Current Status of the Acquisition of Defense Equipment

The current status of the acquisition of defense equipment is described below.

### 1 Unit Prices and Quantities in Procurement

The situation surrounding defense-related expenditure in Japan continues to be difficult. At the same time, as a result of the increasingly high-performance and complex nature of equipment in recent years, the cost of maintenance and upkeep is also growing. Since FY2005, the cost of maintenance and upkeep has overtaken the costs associated with the purchase of major items of equipment and materials, creating an additional strain on the procurement of new major items of equipment and materials. Moreover, the increasingly high-performance and complex nature of equipment and materials has brought about a rise in development and manufacturing costs, inflating the unit price of equipment and materials. These circumstances have brought about a decline in the quantity procured, leading to such problems as difficulties in maintaining and cultivating

highly-skilled factory workers, as well as the emergence of companies withdrawing from the defense business altogether, due to the opaque outlook for the future.

See ▶ Reference 76

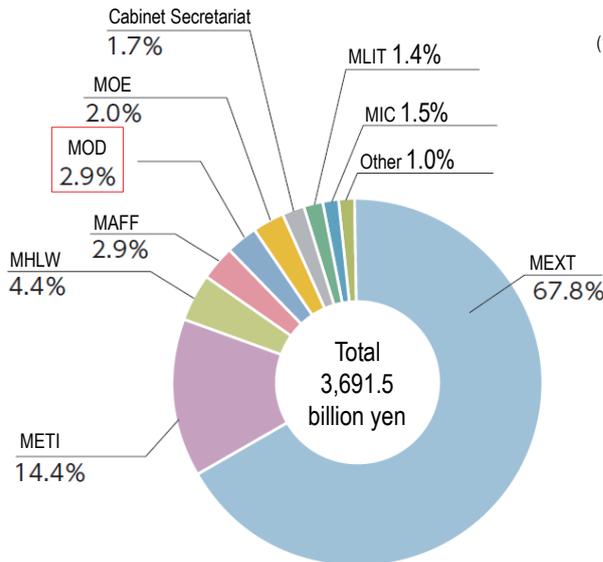
### 2 The Current Status of Research and Development

The situation in regard to research and development expenditure within defense-related expenditure is also harsh, with a reduction of around 20% from the level 20 years ago being seen in FY2012. In terms of the technical strength of the defense industry, trends in the research and development budget have a considerable influence over the maintenance and improvement of skills among engineers in companies, because such skills are maintained and cultivated by working on research and development projects.

(See Fig. III-3-1-2)

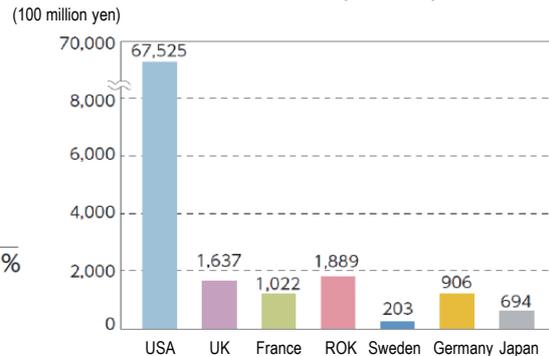
Fig. III-3-1-2 Current Status of Research & Development Expenditure

Japan's Science & Technology Budget by Ministry (FY2012 Budget)

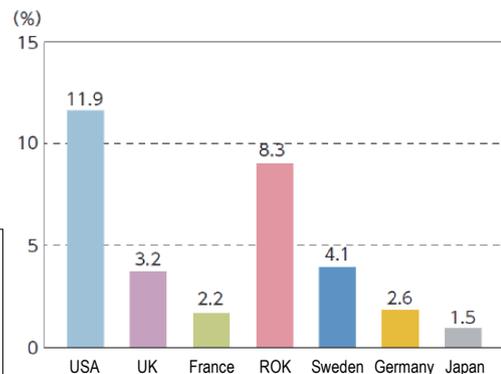


Source: Cabinet Office Website on Science & Technology Policy

Defense R&D Expenditure of Major Countries (FY2011)



R&D Expenditure as a Proportion to Defense Expenditure of Major Countries (FY2011)



Source: OECD: Main Science and Technology Indicators 2012/2 edition; The Military Balance 2012

<Reference> Defense R&D Expenditure as a Proportion to Government-funded Research Expenditure in Major Countries (2011)

Japan 2.7% USA 56.8% France 6.8%  
UK 14.6% Germany 4.0% ROK 16.3%  
Sweden 7.8%

Source: Main Science and Technology Indicators 2012/2 edition

### 3 The Situation Overseas

Western countries are promoting joint development and production of defense equipment with allies and friends, in order to cope with soaring development and production costs. By doing so, one can expect demand for the item of equipment in question to increase compared to the situation when a single country develops and produces an item, spreading among all of the countries participating in the joint development and production initiative, and each country's technical strength improves as its defense industry comes into contact with excellent technologies from other countries.

Moreover, in Western countries, there has been a tendency to strengthen competitiveness through the restructuring of the defense industry. Whereas the repeated rounds of mergers and integration in the U.S.A. have primarily involved only U.S. companies, in Europe there have been mergers and integration in the defense industry involving multiple companies, mainly centering on Germany, France, the UK, and Italy.

### 4 The Current Status of the Contract System

In the field of public procurement, it goes without saying that concluding contracts based on the price determined by the market (market price) is the most rational and efficient option. Defense equipment is no exception to this, the fundamental principle in determining the appropriate price for defense equipment – that is to say, in calculating the estimated price – is the use of the market price method, which involves calculations based on the market price. However, due to the specific nature of defense equipment, there are many items that do not have a market price, so in such cases, the cost accounting method is used, which involves adding together the costs and expenditures actually required in the manufacture of the item in question, and then adding an appropriate amount of profit to that basic cost.

If one actually looks at central procurement in FY2011 in terms of the method used to calculate the estimated price, one can see that use of the market price method by far exceeds the use of the cost accounting method, with the former being used in about 5,800 cases and the latter in around 2,900 cases. However, a great deal of the defense equipment and materials supplied on the basis of contracts in which the estimated price has been calculated according to the cost accounting method involves large sums of money, so when compared in terms of the

contract sum, items calculated on the basis of the market price method totaled approximately 380 billion yen, while those calculated on the basis of the cost accounting method totaled approximately 1.09 trillion yen; thus, one can see that the latter is far higher.

Under the cost accounting method, each and every cost required is accounted for in calculating the price, so this has the advantage for the Ministry of Defense of making it easy to explain the appropriateness of the cost of defense equipment. On the other hand, a set proportion of the cost is allocated in the price as appropriate profit under this calculation method, so from the company's perspective, they will earn more profit from a higher cost, which eliminates their incentive to reduce costs.

Furthermore, in relation to defense equipment for which the estimated price has been calculated according to the cost accounting method, it is particularly difficult to establish the cost of equipment that is still at the research and development stage or in the initial stages of mass production, when first concluding a contract, so the form of contract employed in this situation is called a cost audit contract. This involves an audit being carried out around the time the performance of the contract is completed, to ascertain the actual costs incurred (actual cost); if the profit to be received by the company has increased compared with the initially estimated actual cost because its costs have decreased, the relevant profit is classed as excess profit and deducted from the contract sum or reimbursed to the contracting body. In such cost audit contracts, profits earned by a company as a result of achieving cost reductions are also classed as excess profit subject to deduction or reimbursement, so this motivates companies to perform the contract as close to the originally estimated cost as possible, thereby making it increasingly difficult to achieve cost reductions.

In addition, from the succession of cases of overcharging by defense-related companies that have been revealed since January 2012, it has emerged that this contract method is a factor contributing to overcharging, with companies inflating the actual cost by adding man-hours (the amount of work expressed as the number of factory workers directly involved multiplied by the number of hours worked) arising from one contract to a different contract, with the objective of maximizing the profits that they can obtain, as there is no system for compensating companies in the event that the actual cost exceeds the originally estimated cost.