

# Mechanization and the Japanese Port Worker

—— 機械化と日本の港湾労働 ——

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## 1. INTRODUCTION

The shipping industry has undergone tremendous technological changes within the last decade. Key emphasis has been laid on

cargo unitization as a result of its safety and cost effectiveness. Notable among them are pallets and containers.

To meet the changing demand of ships, port transportation businesses have also gone through several innovations. Thus, the business which used to depend greatly on labor, has now been reversed to a capital intensive one with the ratio of capital to labor increasing. Use of machines like transtainers, etc., have replaced the men on the job.

Introduction of containerization and thus mechanization of port activities has been differently received in different countries. In Japan, mechanization of port activities was successfully carried out with minimum stoppages and opposition from the workers.

However, as Mannari and Harsh noted in their study of a Japanese factory, "rapid rate of tech innovation poses problems of adaptation for Japanese workers and this might give rise to resistance or at least to reservations in their attitude toward rationalization."<sup>1</sup> It is this issue of attitude toward rationalization which is the focus of this paper. Our main intention is to find out how Japanese port workers have responded to mechanization and whether one's status in an organization, i.e. whether one is a regular or temporary worker, has any relation to one's attitude towards rationalization.

Traditional approaches have laid emphasis on the lifetime employment system, seniority promotion system, and the existence of enterprise unions as the main features of Japanese companies. These characteristics have however been seen to prevail mainly in large companies which are said to be of the 'labor managed' type with employees sharing in the profits of the firm. According to Japanese standards of industrial classification, most port trans-

port companies fall under the small and medium category.

Furthermore, the historical structure of port labor, like the prevalence of casualism, makes the lifetime employment system inapplicable in the ports.<sup>2</sup>

The above characteristics of Japanese firms are said to be the reasons for the stable industrial relations leading to less resistance to rationalization measures. However, industrial relations in the ports have been relatively peaceful in spite of the fact that the structure of the Japanese port workers, including their unions, is different from most other sectors. We shall, by using the attitude to mechanization as an indirect measure of industrial relations, find out the reasons for the peaceful and stable relations in the ports.

In the next sections, we shall briefly give the main features of port labor in Japan, including the labor unions, proceed to the methodology for the study, and present the major findings and conclusions that we draw from the study.

#### NOTES :

(1) This paper is intended to be a summary of my Master of Arts thesis of the title *The Effects of Mechanization on Productivity and Industrial Relations in the Port Transport Industry in Japan*.

Hitotsubashi University, 1986. I am particularly indebted to professors Konosuke Odaka and Yukihiro Kiyokawa for their encouragement and advice. I alone am responsible for any remaining errors.

(2) Robert M Harsh and Hiroshi Mannari : 'Japanese Workers Response to Mechanization and Automation' : *Human Organization*, Vol 32 No. 1 Spring 1973 p.91

(3) See for example Sakai Yoshinaga, 'Kowan rodo shijo no jukyu bunseki' (Supply and Demand Analysis of Port Labor), in Kitajima Shojiro (ed.), Kowan Rodo (Port Labor) .1985 p.31.

## 2. Some features of Japanese port workers

A major characteristic of Japanese port labor is the existence of a dual labor structure, regularly employed and temporary workers. Regular workers, as defined by the Port Labor Law, are those on long term contractual agreements with the operators while the temporary are workers contracted on daily basis or working for a fixed period less than two months.

The following table (Table 1) shows the employment trend of regular and temporary workers for the period 1973 to 82.

Table 1

Year	Regular Workers	Temporary Workers*
1973	99,637	234,193
1974	93,147	186,506
1975	93,412	123,325
1976	89,103	124,258
1977	88,911	118,990
1978	86,452	96,986
1979	85,599	101,021
1980	82,867	90,141
1981	82,056	77,764
1982	82,000	77,000

\* Figures for temporary workers refer to monthly total.

Source : Ministry of Transport.

Unpublished date.

There has been a decrease in the employment of regular as well as temporary labor in all the sectors with the lighterage sector experiencing the greatest fall in employment. While there was a decline in the number of regular workers from the 1973 peak of 99,637 to 82,000 in 1982, the effect was more pronounced in the case of temporary labor with the monthly total decreasing from 234,193 in 1973 to 96,986 in 1982.

In the case of the regular workers, there have been varying effects of mechanization on the various sectors. There was a decrease in shorehandling labor force from 43,400 in 1973 to 35,000 in 1982 and the stevedoring labor force also decreased by 27.5 percent in the same period. The effect was more pronounced in the lighterage and raft sectors. Employment in the raft and lighterage sectors declined by 40 and 47 per cent respectively.

The temporary workers are classified into two categories : registered and non-registered. The registered temporary workers report daily to the Employment Stabilization Bureau of the Ministry of Labor where they are allocated to the various operators requiring extra hands.

In the absence of any job, they receive an "employment adjustment allowance" which is paid daily by the Bureau and are legally forbidden from taking up any job at either the ports or any other sector. The allowance, which is paid daily, differs depending on the wage income earned in the past and the number of days worked in the previous months. This system prevails in only the five main ports, i. e. Yokohama/Tokyo, Nagoya, Osaka, Kobe and Kanmon.

The fund for the payment is jointly contributed by the operators, the government and the temporary labor in employment. The ordinary port transportation operators, stevedoring operators and

longshore cargo handling operators contribute ¥1.5 per ton of charges received from shippers and shipping firms and ¥400 per labor when they employ temporary labor to the Association for the Promotion of Employment. This levy is ultimately borne by shippers and shipping firms in the form of surcharges. The national government's subsidy forms a third of the total fund.

In periods when there are increases in the demand for port labor, especially in the beginning and end of months, or when working a specialized vessel, like a car carrier where the services of drivers are essential, other category of workers are contracted on daily basis to supplement the regular and registered temporary workers. They are classified as nonregistered workers and their numbers are said to be very small.

The dependency ratio on temporary labor, i.e. the proportion of temporary labor in the total labor force, decreased from 50 percent in the 1960's to about 5 percent in 1982. The decrease in the dependence on temporary labor was seen to be the result of the "labor permanentization policy" adopted in 1965 with the introduction of containerization to secure a regular supply of port labor.

Having seen the effects of containerization on employment, we shall in the following paragraphs, digress a bit to see the effect the introduction of containerization has had on productivity, wages, working hazards and working hours as they may also have an indirect effect on the attitudes the worker will have towards mechanization.

The fall in the employment of both regular and temporary workers occurred in the midst of increasing output in the industry. The volume of cargo handled in the ports increased from 808.3 million tons in 1965 to 2,908.6 million tons in 1980. With most of the cargo being handled in containers, the rate of containerization

increased from 0.3 and 0.7 percent in 1969 to 59.5 and 73.5 percent in 1981 for exports and imports respectively. These figures are in terms of volume and likely to be even higher when considered in value terms.

The increase in the rate of containerization led to increasing mechanization in the form of the use of container handling equipment. The extensive use of container handling equipment is therefore seen as the main contributing factor to the decline in employment in the ports.

The introduction of mechanization could be seen to have had some favourable effects on wages, work hazards and productivity in the ports. Injuries and deaths reduced by over 50 percent between the early part of the 1970's and 1983.

Wages of port labor have been on the upward trend and are higher than most other occupations. With the average monthly wage of port workers been lower than those in manufacturing, transport and communication and electricity, gas and water supplies in 1960, wages of port workers increased considerably and by 1975, were higher than all the other workers in similar occupations except those in electricity, gas and water. In 1982, while average wages were ¥ 201,644 in manufacturing, ¥ 166,740 in construction (laborers) and ¥277,328 in electricity gas and water, the average wage of port labor was ¥288,660. The temporary workers currently receive an average wage of between ¥200,000 and ¥250,000 and twice yearly bonuses of between ¥ 330,000 and ¥ 350,000 which is only slightly below that of the regular workers.

The reduction in the length of monthly working hours of port labor from 197.4 in 1960 to 187 in 1982 affirms the high monthly wage rate of port workers. However, there are said to be instances

where wages are below the minimum especially in the raft, lighterage and other related sectors. This is in part due to the use of unregistered labor due to their readily acceptance of lower wages and willingness to work far in excess of the prescribed number of hours.

The increase in wages of port workers was not due to the seniority system but due to the increasing importance the government attached to port work, for example, the enactment of the port Labor Law and the establishment of Port Colleges to train workers in the use of handling equipment etc.. Increasing productivity was also an additional factor for the wage increase.

The introduction of containerization has led to considerable increases in labor productivity. Average labor productivity in shorehandling increased from 39 tons per day in 1970 to 105 tons in 1983 while that of stevedoring also went up threefold in the same period.

Increasing output and productivity and declining employment have been seen to be the main effects of the introduction of mechanization. Before we assess how the workers have received and adapted to such changes, we shall discuss the activities of the labor unions and their response to mechanization.

### 3. Labor Unions

The structure of port labor unions differs from that prevailing in most other industries in Japan. There is the existence of both enterprise and occupational unions, and a union consisting of only temporary workers. For a clear understanding of the issues involved, we shall briefly discuss the historical development of the labor unions, their effect on labor management relations, and the



response of labor unions to new technology.

Labor disputes were evidenced in the pre-war days. They were mainly spontaneous reactions to the increase in the price of rice without any corresponding increases in the wages of port workers. The workers were controlled by labor contractors and did not have any direct relationship with the operators they worked for. The boss-gang system was a common feature and working conditions were said to be very poor.

The laborers were classified into three groups, i.e. first-class labor—those on long term contractual agreements with the contractors; ; second-class labor—those employed on daily basis but given preferential treatment over the non-classified; and other categories—those other than first and second-class labor and also employed on daily basis. The fluctuating nature of port operations, mainly derived demand, necessitated the maintenance of a small number of first-class labor (regular) and the use of temporary labor to supplement operations during peak periods. Some of the first class labor were provided with food and accommodation by the labor contractors.

The workers worked from dawn to evening. On the average, the first-class workers worked for about 23 days in a month, 20 days for second-class and between 17 and 18 days for the other category of workers.

The increase in war time supplies during the Japan-China war in 1937 led to drastic changes in port operations. The contractors formed themselves into Port Operation Companies and labor also migrated to the ammunition producing industries due to the high wage in that sector. Shortage of labor resulted in the government granting an assistance of ¥ 17 million between April

and September 1942 for mechanization and stepping up the importation of labor from the colonies.

As one of the measures to increase port labor, a cabinet decision of 10th November 1942 enacted a policy to increase war time longshoremen strength. The main objective of the policy was to increase efficiency by 50 per cent. To achieve this, there was the introduction of a monthly wage system which was at par with those in other high wage sectors, and the change to an efficiency incentive wage system. Port operational companies were obliged to normalize the employment of workers and each company had to take up a fixed number of permanent workers and also see to their welfare. There was also a change in the name of port labor from 'okinakashi', 'hamanakashi', 'hamaninbu' (longshoremen, stevedores, ect. ) to 'kinrosha' (working man) by the National Service Movement.

The democratic tendencies following the defeat in the war led to the formation of the Japan Port Workers Confederation (Zen Nihon Kowan Rodo Kumiai) with the basic aim of negotiating conditions of service with the operators, the Japan Harbor Transport Association ( J.H.T.A. ). In 1947, the International Labor Organization ( I.L.O ) adopted a policy of 'permanentization of port labor' and this served as a stimulus for the labor union. The union demanded a Port Labor Law which was, after protracted negotiations, finally enacted in June 1965 with the basic objective of securing "the manpower resources necessary for port transport services and to promote the stability of employment and welfare of dockworkers by regulating their employment, so that it may ultimately contribute toward the development of the national economy". No formal instrument of collective bargaining was however adopted in spite of the enactment of the Port Labor Law.

'Enterprise Unionism, has been seen to be core of the Japanese trade union structure. Most of these enterprise unions are affiliated with Sohyo, Domei, Shisanbetsu, Churitsuroren. Some of them however, remain independent enterprise unions. A similar view could be expressed about Japanese port labor unions. Labor is organized at the firm level then grouped according to ports to form the Kobetsu Rengotai (Port - based Union Alliance). A confederation of all port labor unions then form the Zenkoku teki chuo soshiki (the National Organization) .

As a result of the fact that the center of gravity of the union is the enterprise unions, and furthermore, taking cognisance of the fact that there was a high dependency ratio on temporary labor, the organizational rate of the unions were said to be very low. Thus, the feeble nature of port labor unions and inherent organizational problems left the effect of containerization on employment very great .

In the early part of 1970, there were moves within the unions to restructure the weak organizational nature. Reasons for the sudden change included among other things the following: 1 ) the realization of the obvious limitation of enterprise unions in Japan; 2 ) the merits from the increasing volume of cargo and containerization were not coming to the direct users, i. e. port labor; 3 ) increasing demand for labor leading to the permanentization of labor resulted in a reduction in temporary labor and an increase in organized labor.

The adoption of cargo unitization and the introduction of mechanization led to changes in labor-management relations. This was possible as a result of concerted efforts taken to unite the small and numerous labor unions into two main unions, i. e. the

National Council of Dockworkers Union of Japan and the Liason council of Port Transport Workers Union. It is said that the reorganization of the labor unions served to strengthen their bargaining power and led to increases in wages.

The main characteristics of the Japan Council of port and Harbor Workers' Union is that of being a reformist and emphasising on workers' rights especially with respect to employment since almost all the temporary workers unions belong to it. On the contrary, the Port Division of Transport Workers Union (affiliated with the Japanese Confederation of Labor) aims to better working conditions through cooperation with employers, thus acting in a comparatively moderate way.

The first formal collective agreement between the labor unions and management came into being in 1972. However, the special characteristics of port labor unions in Japan, i.e. the existence of both occupational and enterprise unions, affected greatly the implementation of most of the agreements. For example, because the use of large automated vessels, like the ro-ro type, require less labor, the labor unions negotiated for their prior consultation before any such specialized vessel is introduced into the port. However, that clause in the agreement is not being adhered to. It is believed that the enterprise unions do not throw their weight behind the occupational unions when the latter goes to the negotiating table with the J. H. T. A.

Currently the organizational rate for the unions is 70 percent for regular employed workers and 99 per cent for the temporary workers. The temporary workers belong to the Japan Harbor workers Union showing a very close relationship between union and status in the ports. All the unions, with the only exce-

ption of the All Japan Seamen's union are open shops and like most other unions have as their aims: 1 ) raising wages, 2 ) shortening working hours, 3 ) increasing paid holidays, 4 ) expanding welfare facilities, and 5 ) securing job opportunities.

Union policies toward technical change normally come in the form of willing acceptance, opposition, i. e. striking or forbidding its members to use it, competition, i. e. accepting to keep the old method in use in competition with the new, encouragement and adjustment — to be in a position to control the new equipment, process or material<sup>3</sup>.

The labor unions reaction to the new technology, i. e. cargo unitization and mechanization, differed from their counterparts in Boston and San Francisco. The Boston longshoremen adopted a policy of opposition while the International Longshoremen and Warehousemen's union (I.L.W.U.) of San Francisco, conditionally adopted a policy of encouragement<sup>4</sup>. The port labor unions in Japan however, adopted a policy of initial opposition and later took to an adjustment stand.

#### 4. Attitudes Toward Mechanization

Having briefly discussed the nature of Japanese port workers including the development of the labor unions, we shall now move on to the main focus of the paper which is to find out the attitudes of the workers to mechanization, the major rationalization measure adopted which has had considerable effect on the employment of port labor.

Our main interest is to identify the various factors that influence attitudes to mechanization in order to confirm or discard

the cultural approach to industrial relations in Japan. Our main tool is the use of a sample survey through a designed questionnaire.

NOTES ;

- (1) This section is heavily dependent on Homma Sempaku Sakugyo kabushiki Kaisha, Homma Sogyo HyakunenShi (The 100 years of Homma Company) .
- (2) Labor unions in Japan are normally affiliated to one of the National Centers. They are divided according to political allegiance or lack of them.

Sohyo - (General Council of Trade Unions of Japan) . It was founded in 1950 and is the largest of the unions. It is ideologically left wing socialism, and its membership lies predominantly in government employment.

Domei - (Japan Trade Union Congress) . Founded in 1964 and ideologically right wing socialism. Most members are in private employments.

Churitsuroren - (Federation of Independent Unions) .

Shisanbetsu - (National Federation of Industrial Organizations)

Churitsuroren and Shisanbetsu are independent groups. In economic matters, they normally associate with Sohyo. Apart from these general unions, there are some unaffiliated enterprise unions.

- (3) Slight Summer H., Kames J. Healy, Robert E. Livernash. The Impact of Collective Bargaining on Management; The Brookings Institution, Washington, 1960 p.344.

- (4) Ibid p.358- 9 .

## 5 . The Hypothesis

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## 6 . The Sample

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## 7 . The Schedule

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## 8 . Treatment of Data

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## 9 . Findings

Our major findings from the study were that the Japanese port workers are indifferent to mechanization and that the attitudes of regular and temporary workers are significantly different. of the 212 workers, only 70 of them were in favor of mechanization with over 54 per cent of them taking to the middle course.

We begun by hypothesising that since regular workers had implied employment guarantee and the temporary labor were also protected under the Port Labor Law, the two groups could be thought of as not having significant differences toward mechanization. However, while a greater percentage of the regular workers were indifferent to mechanization, about 72 percent of the temporary workers were against mecanization of which 12 per cent were strongly against

Table 2 a

	Strongly against	Against	Indifferent	In favor	Strongly in favor
Regular	0	9 (4.25)	108 (50.94)	67 (31.60)	3 (1.42)
Temporary	3 (1.42)	15 (7.08)	7 (3.30)	0	0
Total	3 (1.42)	24 (11.32)	115 (54.24)	67 (31.60)	3 (1.42)

\*Figures in paranthesis are percentages

The following results were obtained using the t - test to analyze the mean responses:

Table 2 b

Category	Mean Response	Variance	T - value
Regular	45 . 28	unequal	9.3552
Temporary	31 . 00	equal	10.9405

The 45.25 mean score for the regular labor, according to our scale, shows their indifference to mechanization while the low score of 31.00 of the temporary labor shows that they were against mechanization. Furthermore, the t values under the assumption of both equal and unequal variances did not support our null hypothesis of no difference in attitudes.

What could have led to the differences in attitudes? Interviews with the temporary workers brought to light the fact that they did not see any possibility of an increase in their employment. The continued decrease in their numbers was gradually decreasing their bargaining power. Though they accepted the fact that things had improved with the coming into force of the Port Labor Law



and the institution of employment adjustment allowance etc., they preferred a system where they could exert greater control of affairs in the ports. Some of them mentioned the American hiring hall system as a better alternative.

Does the type of union one belongs to have any influence on his attitude to mechanization? Our initial conjecture was that the attitudes of enterprise unions would be more favourable than those of the other unions. This was based on the fact that the enterprise unions were identified with particular companies and negotiated general conditions of service with the companies while the occupational unions normally acted in concert and had joint negotiations with the Japan Harbour Transportation Association. Table 2a shows the results obtained using the pairwise t, REGWF and REGWR test.

Table 3 a

Union Category	Mean	N	pairwise	Regwf *	Regwr *
Hamakoren	45.382	60	A	A	A
Enterprise	45.332	83	A	A	A
Non-unionized	44.533	45	A	A	A
Zenkowan	31.130	23	B	B	B

Note:

Hamakoren - Yokohama Rengo Kumiai

Zenkowan - Yokohama Port Branch of the Zen  
Kowan Rodo Kumiai

\* Means with the same letters are not significantly different

From the above table, it is evident that only the Zenkowan Union had a significantly different mean from the other groups. Since the Zenkowan consists of only temporary workers, it is not surprising that their mean is about the same as that of the temporary workers. It is however surprising that the non-unionized workers should have a response rate which is not different from the Hamakoren and the enterprise unions. The dependency of union and attitude is further confirmed using the scale of measuring attitude shown Table 3b.

Table 3b

Type of union	Strongly against	Against	Indifferent	Infavor	Strongly in favor
Enterprise	0	3	49	29	2
Hamakoren	0	2	34	23	1
Non-unionized	0	4	26	15	0
Zenkowan	3	15	6	0	0
TOTAL	3	24	115	67	3

Chi-Square (CS) 101.667 DF 12 PROB 0.0001

Contingency Coefficient (CC) 0.569

Likelihood Ratio Chi-Squared (LRCS) 74.65 DF 12 PROB  
0.0001

This confirms our earlier finding that the status of the worker is the most important factor in determining his attitude to mechanization as the unions were directly related to status. Whether one

would have favourable or unfavourable attitudes to mechanization depends on whether one is regular or temporary.

## 10. Separate Analysis of Regular and Temporary Workers

Analysing the combined results of both temporary and regular workers, the only variable we found to be affecting attitudes to mechanization was the status of the worker. We would in this section find out whether any form of variation exists within particular groups.

People with higher education are said to have better job opportunities since they are easily adaptable to new situations. We therefore conjectured that the higher one's education, the more favorable would be his attitude toward mechanization.

Table 4 \*

Level of Educ.	N	Mean Response	T	REGWF	REGWR
High sch. and above	76 (12)	46.43 (28.50)	A (A)	A (A)	A (A)
High sch. drop out	18 (6)	43.89 (36.67)	A (A)	A (A)	A (A)
Junior high	81 (4)	44.64 (32.75)	A (A)	A (A)	A (A)
Junior high drop out	2 (—)	46.00 (—)	A (—)	A (—)	A (A)
Elementary	8 (2)	44.00 (28.50)	A (A)	A (A)	A (A)

\* Results of temporary workers are shown in brackets

However, classifying the total sample into five categories ranging from high school to elementary school, all the three tests did not confirm our assertion. It is interesting to note that among the regular workers, the high school graduates have the highest response confirming our earlier hypothesis, but among the temporary workers, the mean response of the high school graduates were the lowest and on the same level as the elementary school graduates.

Our general conclusion is that educational standards have no effect on attitudes toward mechanization probably due to the high educational standards of Japanese port workers.

The high average age of the Japanese port workers was made clear in the previous section. Some of the workers had been there before the rapid introduction of mechanization. Having been witnesses to their fellows losing their jobs, we contended that the older the fellow, the more unfavourable would be his response to mechanization. An additional reason for our conjecture was that the young workers being employed might be skilled in the operation of the machines and might also have greater potentials for adaptation than the older ones in coping with the changes in the trends of the trade. Grouping together the temporary and regular workers, no differences were observed among the various categories.

Separate analysis of age yielded non-monotonic response. In the first place, among the regular workers, those in the age brackets 19-25 and 55 or more had unfavourable attitudes which were significantly different from the others. It could be interpreted to mean that the very young ones who did not have enough experience with mechanization might have been frustrated knowing that there were very few opportunities for advancement. On the other hand, the very old ones might have seen the effects of mechanization on employment thus their lower mean score.

In the case of the temporary workers, there were none in the lowest age bracket of 19-25. However, the youngest among them, i.e. those in the 28.5-35 age bracket, had the lowest score. This reaffirms our findings among the regular workers that the younger ones were against mechanization. What could have been the factors leading to such uniform behaviour among the younger ones? Unlike the regular

workers, however, those above 55 years among the temporary workers had rather higher means. The modal age group among the temporary workers was 55+, whilst for the regular workers, they were between 40.5 and 55. This also shows the aging nature of the temporary labor.

Table 5

Age Group	N	Mean Response	T	REGWF	REGWR
19-25	6 (-)	43.00 (-)	B (-)	B (-)	B (-)
25.5-30	7 (2)	51.00 (20.00)	A (B)	A (A)	A (A)
30.5-35	13 (2)	46.69 (28.50)	A (B)	A (A)	A (A)
35.5-40	25 (5)	45.04 (30.20)	A (A)	A (A)	A (A)
40.5-45	38 (2)	45.37 (38.50)	A (A)	A (A)	A (A)
45.5-50	35 (3)	45.14 (35.67)	A (A)	A (A)	A (A)
50.5-55	38 (3)	45.34 (30.33)	A (A)	A (A)	A (A)
55+	22 (7)	43.77 (31.57)	B (A)	A (A)	A (A)

Among machine operators and non-operators, neither regular nor temporary workers exhibited intra group differences. Shorehandling and lighterage workers had significantly different means among the regular workers. The lighterage workers had the lowest mean score which is in line with our initial hypothesis that they might have relatively unfavourable attitudes as a result of the severe effect of mechanization on their employment.

Among the temporary workers, the stevedorers had the least mean score and together with those in the other sectors, had significantly different mean from the shorehandlers.

In relation to length of experience in the ports and attitudes, intra group means were observed using the pairwise t-test, whilst those with the longest experience in the case of the regular workers

had the lowest mean response, those with experience between 20 and 25 years among the temporary workers had the least mean response. The lowest mean response of those with the longest experience could be explained from our earlier hypothesis that, since they have gone through the full process of mechanization, they might have doubts as to the effectiveness of mechanization in assuring them of job opportunities.

Regrouping the data brought to light intra group differences in age groups, job contents and length of experience using the pairwise t-test for the analysis. Our earlier results were further confirmed when we used the contingency table analysis to cross classify the various groups against the scale we use in the measurement of attitudes.

## 11. Conclusions and Implications of the Study

A basic conclusion that could be drawn from the study is that the status of the worker is the most important determinant of his attitude to mechanization. This partially confirms Harsh and Mannari's conjecture that "it seems likely that the beliefs and ideas an employee has concerning the consequences of rationalization arise from his own status in the factory and his immediate work experience though of course more highly educated employees are also likely to be influenced by things they have read about rationalization"<sup>11</sup>. The labor permanentization policy could therefore be seen as the main contributing factor to the stable industrial relations in the ports.

Industrial relations in the industry is stable because of the large number of regular workers. Our questionnaire survey revealed that the temporary workers were unfavourable to mechanization and they

could have caused havoc if their numbers were to be substantial enough for the effects of their actions to be felt.

Another reason behind the stableness in industrial relations could be because of the past activities of the unions. The port labor unions were very voiceferous during the pre-war days and in order not to have a repetition, the port operators might have intensified mechanization. Reducing the number of workers and paying the remaining higher wages might therefore have been the policy of the operators.

Some questions still remain unanswered. Were the regular workers independently expressing their attitudes? What is likely to happen with increasing automation and part-time workers? Could similar results have been obtained from other countries?

A basic limitation of the study was the great skewness of our sample, i.e., the regular workers far outnumbered the temporary ones. It would be necessary for any similar study to take a vivid account of the temporary labor. A comparison of measurement of attitudes toward mechanization and management could serve as an alternative measure of industrial relations and really confirm or discard the cultural approach to industrial relations in Japan.

#### NOTES:

- (1) Harsh and Mannari (1973) p.89.

(付) 本稿は紙幅の関係で一部割愛させて頂いたことを付記いたします。