

12.4 Financial Evaluation

Case I, Case II, Case III and Case IV show the financial cost and revenue flows and the results of financial evaluation, respectively.

The financial viability of the project was tested making use of the conventional criteria of FIRR (Financial Internal Rate of Return), and both B-C (Net present value Benefit minus Cost) and B/C ratio (Benefit and Cost Ratio) at two discount rates of 5% and 10%.

Table 12.4-1 Summary of Economic Evaluation

	FIRR (%)	Discounted at 5%		Discounted at 10%	
		B-C (Rp.million)	B/C (%)	B-C (Rp.million)	B/C (%)
Case I	minus	-43,577	0.10	-40,981	0.07
Case II	minus	-32,558	0.13	-28,131	0.10
Case III	minus	-27,293	0.15	-24,484	0.11
Case IV	9.28	135	1.03	-15	0.99

The major findings derived from the above evaluation results are briefly summarized as follows:

- (1) Judging from the FIRR, the project becomes financially viable only in Case IV.
- (2) Excluding the capital investment costs, the financial service revenue is expected to exceed the maintenance and operating costs after 5 years from the start of operation of the Center in all of 4 Cases.
- (3) The cost burden of foreign experts is extraordinary high in operating expenses. Thus, it is highly desired to receive some form of external assistance in this cost item, or to achieve the technical transfer from foreign to local experts as soon as possible.

- (4) In Case IV, in which all of capital expenditures and the costs of foreign experts are assisted either by the central government or by an overseas international organization, the FIRR reach as high as 9.3%. This rate is judged to assure rather healthy operation of the new Center as one of the governmental technical support organizations for the industry.

Table 12.4-2 Financial Cost and Revenue Flows and the Results of Financial Evaluation - Case I

(Unit: Rp. million)

Year	Cost			Service revenue			Cash flow
	Investment	Operation	Total	Test & Ins.	Tech.service	Total	
1989	-2,116		-2,116				-2,116
1990	-6,421		-6,421				-6,421
1991	-47,837		-47,837				-47,837
1992		-2,109	-2,109	146	194	340	-1,769
1993		-1,836	-1,836	217	232	449	-1,387
1994		-1,402	-1,402	254	271	525	-877
1995		-1,121	-1,121	298	310	608	-513
1996		-694	-694	349	348	697	3
1997		-725	-725	410	387	797	72
1998		-742	-742	482	387	869	127
1999		-763	-763	568	387	955	192
2000		-789	-789	669	387	1,056	267
2001	+16,159 ^{1>}	-820	15,339	790	387	1,177	16,516

FIRR

FIRR = Minus

B-C

At 5% = -Rp. 43,577 million
At 10% = -Rp. 40,981 million

B/C

At 5% = 0.098
At 10% = 0.071

- Notes: 1> Residual value for land (Rp. 1,071 million) buildings (Rp. 12,246 million) and machinery (Rp. 2,842 million)
2> See Table 11.3-1 for details of the flow of service revenue.

Table 12.4-3 Financial Cost and Revenue Flows and the Results
of Financial Evaluation - Case II

(Unit: Rp. million)

Year	Cost			Service revenue			Cash flow
	Investment	Operation	Total	Test & Ins.	Tech.service	Total	
1989	0		0				0
1990	-3,333		-3,333				-3,333
1991	-29,997		-29,997				-29,997
1992		-2,109	-2,109	146	194	340	-1,769
1993		1,836	-1,836	217	232	449	-1,387
1994		-1,402	-1,402	254	271	525	-877
1995		-1,121	-1,121	298	310	608	-513
1996		-694	-694	349	348	697	3
1997		-725	-725	410	387	797	72
1998		-742	-742	482	387	869	127
1999		-763	-763	568	387	955	192
2000		-789	-789	669	387	1,056	267
2001	+2,842 ^{1>}	-820	2,022	790	387	1,177	3,199

FIRR

FIRR = Minus

B-C

At 5% = -Rp. 32,558 million
At 10% = -Rp. 28,131 million

B/C

At 5% = 0.127
At 10% = 0.100

Note: 1> Residual value of machinery

Table 12.4-4 Financial Cost and Revenue Flows and the Results
of Financial Evaluation - Case III

(Unit: Rp. million)

Year	Cost			Service revenue			Cash flow
	Investment	Operation	Total	Test & Ins.	Tech.service	Total	
1989	0		0				0
1990	-3,333		-3,333				-3,333
1991	-29,997		-29,997				-29,997
1992		-577	-577	146	194	340	-237
1993		-610	-610	217	232	449	-161
1994		-636	-636	254	271	525	-111
1995		-661	-661	298	310	608	-53
1996		-694	-694	349	348	697	3
1997		-725	-725	410	387	797	72
1998		-742	-742	482	387	869	127
1999		-763	-763	568	387	955	192
2000		-789	-789	669	387	1,056	267
2001	+2,842 ^{1>}	-820	2,022	790	387	1,177	3,199

FIRR

FIRR = Minus

B-C

At 5% = -Rp. 27,293 million

At 10% = -Rp. 24,484 million

B/C

At 5% = 0.148

At 10% = 0.113

Note: 1> Residual value of machinery

Table 12.4-5 Financial Cost and Revenue Flows and the Results of Financial Evaluation - Case IV

(Unit: Rp. million)

Year	Cost			Service revenue			Cash flow
	Investment	Operation	Total	Test & Ins.	Tech.service	Total	
1989	0		0				0
1990	0		0				0
1991	0		0				0
1992		-577	-577	146	194	340	-237
1993		-610	-610	217	232	449	-161
1994		-636	-636	254	271	525	-111
1995		-661	-661	298	310	608	-53
1996		-694	-694	349	348	697	3
1997		-725	-725	410	387	797	72
1998		-742	-742	482	387	869	127
1999		-763	-763	568	387	955	192
2000		-789	-789	669	387	1,056	267
2001		-820	-820	790	387	1,177	357

FIRR

FIRR = 9.28 %

B-C

At 5% = Rp. 135.0 million
At 10% = -Rp. 15.0 million

B/C

At 5% = 1.029
At 10% = 0.995

12.5 Economic Evaluation

As has been described in the previous section, it is not necessarily appropriate to evaluate the proposed project, in which the indirect and intangible economic benefits are very large, by using such conventional criteria for economic evaluation as EIRR (Economic Internal Rate of Return) or B-C and B/C in economic prices. As one of indicative factors for evaluation, however, the calculation of EIRR or economic B-C or B/C with two discount rates of 5% and 10% has been conducted in this section.

The details of the economic cost and benefit flows and the results of economic evaluation are shown in Table 12.5-1, in which the EIRR is calculated as 1.88%. This level of EIRR is considered satisfactory as this type of project.

As the indirect benefits which are expected from the project and not counted in the benefit counting in economic evaluation, there are following items:

(1) Increase of employment opportunities

Reviewing the employment structure of Indonesia, 71% of workers were employed in agriculture sector, 9% in industry sector and 21% in service sector in 1965, while they were shifted to 57%, 13% and 30%, respectively, in 1985. In REPELITA IV, the creation of 1,864,000 new workers per year is expected during the plan period, for which the creation of employment opportunities in industrial sector is most highly expected due to its growth potential. In industrial sector, the metalworking industry is one of the core sectors, as REPELITA IV clearly states "the metalworking industry and machine industry are the important industries for the expansion of productive employment in the industrial sector." Because the major aim of the project is to support the metalworking industry in basic technology development and to assist the linkage-type of small-scale firms to establish a firm linkage with assembly-type of

large-scale firms, this project is expected to contribute largely to the expansion of employment opportunities by fostering highly labor absorptive linkage-type of firms.

(2) Saving of foreign exchange

REPELITA IV aims at the increase of foreign exchange reserves by achieving higher annual increase rate of exports (annual average of 10%) than imports (annual average of 7.7%). Since the proposed project is the import-substitution program of metal parts, which could be achieved through the development of basic technology of local metalworking industry, the effect of savings of foreign exchange is expected to be high.

The development of metalworking technology would further contribute largely to the increase of foreign exchange earning capabilities in the long-term bases through the start of domestic production of capital goods or through the development of international competitive power of Indonesian industrial products in general.

(3) Influence of economic development in general

REPELITA IV tries to enforce an economic policy in which an active participation of private sector is expected for economic development of Indonesia. In the policy, particular emphasis is placed on the development of small-scale of local firms which places the majority share of industrial establishment.

This project primarily aims at the development of these small-scale of firms as modernized medium-sized firms by acquiring higher technology and by achieving established relationship with assembly type of firms.

From the above, the implementation of the Project is expected to give a strong influence on the economic development of Indonesia based on the active participation of private sector.

Table 12.5-1 Economic Cost and Benefit Flows and the Results of Economic Evaluation

(Unit: Rp. million)

Year	Cost			Benefit			Cash flow
	Investment	Operation	Total	Test & Ins.	Tech.service	Total	
1989	-1,071		-1,071				-1,071
1990	-3,567		-3,567				-3,567
1991	-32,103		-32,103				-32,103
1992		-1,601	-1,601	903	556	1,459	-142
1993		-1,422	-1,422	1,455	667	2,122	700
1994		-1,130	-1,130	1,718	778	2,496	1,366
1995		-944	-944	2,030	889	2,919	1,975
1996		-658	-658	2,402	1,000	3,402	2,744
1997		-689	-689	2,843	1,111	3,954	3,265
1998		-706	-706	3,369	1,112	4,481	3,775
1999		-727	-727	3,999	1,112	5,111	4,384
2000		-753	-753	4,755	1,112	5,867	5,114
2001	+13,693 ¹⁾	-784	12,909	5,669	1,112	6,781	19,690

EIRR

EIRR = 1.88 %

B-C

At 5% = -Rp. 7,000 million
At 10% = -Rp. 12,929 million

B/C

At 5% = 0.78
At 10% = 0.55

Note: 1) Residual value of land (Rp. 1,071 million), buildings (Rp. 10,653 million) and machinery (Rp. 1,969 million)

CHAPTER 13

CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 13 CONCLUSION AND RECOMMENDATIONS

- (1) It is recommended that the new Center be established, which aims to contribute to the modernization and the enhancement of the technological level, with specific emphasis on the improvement of quality, of the metalworking industries.
- (2) The Center is proposed to have the following functions.
 - 1) testing and inspection
 - 2) technical assistance and training
 - 3) research and development
- (3) The initial investment in the machinery and equipment would be made, based on the priority orders, in consideration of costs and benefits. However, the Center should be so designed as to have enough space to allow for future expansion.
- (4) The location of the Center is recommended to be in the JABOTABEK area, in consideration of the estimated demands by different areas for the services provided from the Center as well as of the location and service area of the existing similar institutions.
- (5) It is proposed that the Center be an one of governmental organization belonging to BPPI. This is because the functions of the Center are expected to be supplementary with the services extended by such governmental organization as B4T or MIDC, and that the adequate exchange of information and personnel would be readily secured among the same governmental institutions.
- (6) Based on the results of the financial analysis, it is recommended that the initial investment for financing the costs of the land, the building, the machinery and equipment, and the personnel costs of the foreign experts be provided either by the Indonesian Government or by overseas organizations.
- (7) The results of the economic analysis also support the necessity for the urgent establishment of the Center.

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ANNEX II.

QUESTIONNAIRE SURVEY RESULTS

II QUESTIONNAIRE SURVEY RESULTS

1. Time of Survey July, 1988

2. Profile of Companies/Institutes Surveyed

Number of Questionnaires Dispatched: 208

Number of Answers Collected: 88 (Rate of Collection: 42%)

(1) Regional Distribution

Region	Assembly-type	Linkage-type
DKI JAKARTA	3 8	2
JAWA BARAT	4	8
JAWA TENGAH	9	1 1
JAWA TIMUR	4	1
SUMATERA	1 1	0
Total	6 6	2 2

(2) Number of Companies by Size

① Assembly-type

Number of Employees	Number of Establishments					
	DKI JAKARTA	JAWA BARAT	JAWA TENGAH	JAWA TIMUR	SUMATERA	Total
1~ 50	7			2	3	1 2
51~100	5				4	9
101~150	5				1	6
151~200	4					4
201~250	4	1	1		1	7
251~300	3	1	2		1	7
301~350	2					2
351~400	1					1
401~450						0
451~500	1					2
501~550			1			1
551~600	3		1		1	5
601~	1	2				3
Total	3 6	4	6	2	1 1	5 9
(Unknown)	3		2	2		7

② Linkage - type

Number of Employees	Number of Establishments					
	DKI JAKARTA	JAWA BARAT	JAWA TENGAH	JAWA TIMUR	SUMATERA	Total
1~ 10			3			3
11~ 20	1	1	1			3
21~ 30		2				2
31~ 40	1		2			3
41~ 50				1		1
51~ 60		1				1
61~ 70		1				1
71~ 80			1			1
81~ 90		1				1
91~100						0
101~		1				1
Total	2	7	7	1		17
(unknown)		1	4			5

(3) Number of Establishments by Industry (Assembly-type)..... (Q 1 - 1 - 7)

Industry	DKI JAKARTA	JAWA BARAT	JAWA TENGAH	JAWA TIMUR	SUMATERA	Total
Machine tool	4			1	1	6
Agricultural machinery & equipment	4		3	2	5	14
Heavy equipment & construction machinery	7		1	1	2	11
Automotive parts	8	1				9
Motorcycle	2					2
Electric machinery	2					2
Shipbuilding	3					3
Process equipment	3		1	1	5	10
Pump	6	1	1	1	1	10
Diesel engine	6	1	1	2		10
Other (specify)	11	2	1	1	2	16
Unknown	2	1			1	4

Note: Some establishments cover multiple industries.

(4) Number of Establishments by kind of metalworking..... (Q II - 1 - 7)

	DKI JAKARTA	JAWA BARAT	JAWA TENGAH	JAWA TIMUR	SUMATERA	Total
Casting	1	1	4	1		7
Plating			1			1
Heat treatment		1				1
Presswork		1	1			2
Forging						
Machine assembly	1	3	4	1		8
Precision machining						
Sheetwork & welding		4	2			6
Machining	1	2	2			5
Other		1	2			3

3. Kind of Parts Used by Assembly-type Industries

(1) Kind of Parts ordered to Linkage-type Industries..... (Q I, II - 1)

Metalworking	DKI JAKARTA	JAWA BARAT	JAWA TENGAH	JAWA TIMUR	SUMATERA	Total
Casting	9 (4)		2 (2)	1 (1)	5 (1)	17 (8)
Forging					1	1
Sheetwork & welding	6 (6)		2 (2)		1 (1)	9 (9)
Plating	2 (2)		2 (2)		1 (1)	5 (5)
Machining & machine assembly	5 (5)		3 (2)			8 (7)
Presswork	5 (4)		1 (1)	1 (1)		7 (6)
Unknown	25	4	5	3	5	42

(invalid:1)

(invalid:1)

(2) Kind of Parts manufactured in house (Q I, II - 2)

Metalworking	DKI JAKARTA	JAWA BARAT	JAWA TENGAH	JAWA TIMUR	SUMATERA	Total
Casting	5 (3)	1	3 (3)	1 (1)	3 (3)	13 (10)
Forging					1 (1)	1 (1)
Sheetwork & welding	9 (9)		3 (3)	1 (1)	5 (5)	18 (18)
Plating	3 (2)					3 (2)
Machining & machine assembly	13 (8)		3 (3)	1 (1)	4 (4)	21 (16)
Presswork	6 (5)		1 (1)		2 (2)	9 (8)
Unknown	16	3	5	3	5	32

(1) Kind of Parts imported..... (Q I, II-3)

Metalworking	DKI JAKARTA	JAWA BARAT	JAWA TENGAH	JAWA TIMUR	SUMATERA	Total
Casting	7 (5)		1 (1)	1 (1)		9 (7)
Forging	6 (5)		1 (1)			7 (6)
Sheetwork & welding	2 (1)		1 (1)		2 (2)	5 (4)
Plating	1 (1)		1 (1)			2 (2)
Machining & machine assembly	8 (6)		1 (1)	1 (1)	1 (1)	11 (9)
Presswork	3 (3)		1 (1)		1 (1)	5 (5)
Unknown	24	4	6	3	9	46

4. Quality and Inspection

(1) Quality Requirement (Q I, III - 1)

① Required Quality

i) Mechanical Properties

I t e m	Number of Establishments
Hardness	20
Tensile strength	18
Impact value	10
Hot strength	10
Fatigue strength	10
Others	9
Unknown	40

ii) Finishing Precision

I t e m	Number of Establishments
Surface roughness	23
Dimension	25
Roundness cylindricity	19
Run-out with side	16
Squareness	12
Others	10
Unknown	39

Note: Some establishments cover multiple items.

iii) Satisfied with the present qualities ?

Y e s 20 Establishments

N o 19 Establishments

Unknown 26 Establishments

<u>Reason of "No"</u>	<u>Number of Answers</u>
mechanical properties	5
internal defect	6
applicable standards	3
finishing precision	11

Note: Some answers correspond to multiple reasons.

(2) Manufacturing Grade

Forging surface	6
Casting surface	14
Only machining	17
Assembly	11
Others	4
Unknown	34

Note: Some establishments correspond to multiple items.

(3) Type of Order

Type of Order	Number of Establishments
Raw materials supplied	11
Raw materials not supplied	29
Die supplied	6
Die not supplied	16
Fabrication drawings supplied	31
Fabrication drawings not supplied	11
Technical guidance	21
Others	2
Unknown	24

(4) Using imported parts ?

Yes 26 Establishments

No 20 Establishments

Unknown 18 Establishments

<u>Reason of "Yes"</u>	<u>Number of Answers</u>
Quality	21
Price	5
Time of delivery	6
Tie-up	3
Unknown	1

Note: Some establishments correspond to multiple reasons.

(2) Kind of Tests and Inspections requested to Linkage-type Industries..... (Q I, III-2)

Type of Industries	Number of Establishments
Casting	14 (9)
Forging	1 (1)
Sheetwork & welding	11 (8)
Plating	2 (2)
Machining & machine assembly	8 (8)
Presswork	3 (3)
Unknown	43

5. Quality Requirement (Linkage-type) (QII)

(1) Level of Quality

① Content of Inconvenience

Industry	Number of Establishments	Content of Inconvenience	Number of Answers
Raw Material Industry	3	defective material defective size lacking numbers delayed others	3 2
Casting	8	blow hole cavity pinhole shortrun scab burning slag inclusion mold shift wrong contours burr runout shortpours others	6 5 5 4 2 4 4 5 3 5 2 3
Forging and Heat treatment	1	thickness lack warping wrinkle overheat crack roughness mannesman defect decarbonization grain growth white spot quenching crack heat treatment warping hardness not conforming to spec mechanical property not conforming to spec others	1 1
Sheetworking & welding	4	weld crack slag blow hole distortion by welding ratio of repair welding undercut lack of fusion	1 2 1
Plating	1	flaking pinhole discoloration crack	1

Industry	Number of Establishments	Content of Inconvenience	Number of Answers
		dimensional deformation	10
Machining & machine assembly	11	finishing deformation assembly deformation parts deformation material deformation	7 4 1 1
Presswork	3	dimensional deformation finishing deformation rust crinkling breakdown	3 2 1 1 2
Repair & maintenance	1	defective dimension defective finishing defective assembly defective parts defective material distortion by welding weld crack paint-peeling off discoloration	1 1

② Activities for Quality Improvement

Activities for Quality Improvement	Yes	No	Unknown
Institution of quality control	6	6	9
Procurement Control	6	5	10
Inspection Control	5	6	10
Control for particular work schedule	1	7	13
Control for inconvenient factors	3	5	13
Documentation control	1	7	13
Material control	7	2	12
Control for measuring instruments	1	7	13
Non-destructive test		7	14
Others	1		

(2) Inspection

1) Are inspection records well kept ?	Yes	No	Unknown
	<u>11</u>	<u>5</u>	<u>6</u>
2) Inspection made by yourself			
(appearance, size, performance, pressure-resisting, heat-resisting, intensity, others)			
9 14 1 1			Unknown
			<u>7</u>
3) Requesting inspection to other organizations ?	Yes	No	Unknown
Inspection requested	<u>8</u>	<u>6</u>	<u>8</u>
(intensity, size, material, analysis, pressure-resisting, heat-resisting, performance, others)			
3 1 5 1		1	1

4) Frequency of requesting inspection to other organizations () times/year

0	2	Establishments
1 ~ 5	4	Establishments
6 ~ 10		Establishments
11 ~ 15		Establishments
16 ~ 20		Establishments
Unknown	16	Establishments

5) Future plan

Yes	No	Unknown
<u>4</u>	<u>4</u>	<u>14</u>

(3) Working Standards

	Yes	No	Unknown
1) Working manual is available.	<u>5</u>	<u>7</u>	<u>10</u>
2) Working manual is prepared by your firm.	<u>5</u>	<u>4</u>	<u>13</u>
3) Inspection schedule is available.	<u>5</u>	<u>5</u>	<u>12</u>
4) Inspection schedule is prepared by your firm.	<u>6</u>	<u>4</u>	<u>12</u>

(4) Norm

	(SII, ASME, ASTM, ANSI, DIN, BS, JIS, others)	Unknown
1) Norm used	<u>8</u> <u>8</u> <u>3</u> <u>—</u> <u>3</u> <u>1</u> <u>9</u> <u>2</u>	<u>8</u>
2) Norm owned	<u>7</u> <u>2</u> <u>—</u> <u>—</u> <u>2</u> <u>1</u> <u>6</u> <u>1</u>	<u>12</u>

(5) Documentation

	Yes	No	Unknown
1) Flow of working specification and drawings are definite.	<u>4</u>	<u>7</u>	<u>11</u>
2) Person in charge of storage for the above is definite.	<u>3</u>	<u>5</u>	<u>14</u>
3) Place of storage for the above is definite.	<u>3</u>	<u>5</u>	<u>14</u>
4) Updating of the above is recorded.	<u>3</u>	<u>4</u>	<u>15</u>
5) Flow and storage of the above is thoroughgoing.	<u>1</u>	<u>6</u>	<u>15</u>

(6) Periodic Inspection

	Yes	No	Unknown
1) Periodic inspection for measuring instruments is conducted totally.	<u>1</u>	<u>8</u>	<u>12</u>
2) Periodic inspection for measuring instruments is conducted partially.	<u>4</u>	<u>7</u>	<u>11</u>
3) Reasons for not conduction periodic inspection:			

<Number of Establishments>

Not knowing any inspection organization.	<u>3</u>
Inspection organization is not available nearby.	<u>4</u>
Cost for inspection is too expensive.	<u>1</u>
No need	<u>6</u>
Others	<u>—</u>
Unknown	<u>11</u>

(7) Administration System

	Yes	No	Unknown
1) Are manufacturing drawings well arranged ?	<u>10</u>	<u>4</u>	<u>8</u>
2) Are manufacturing specifications well arranged ?	<u>9</u>	<u>4</u>	<u>9</u>
3) Does any department for developing new products or techniques exist ?	<u>1</u>	<u>10</u>	<u>11</u>
4) The above is activated ?	<u>1</u>	<u>6</u>	<u>15</u>
5) Does any department for schedule control exist ?	<u>2</u>	<u>7</u>	<u>13</u>

6) The above is activated ?	2	6	14
7) Is periodic inspection for facilities conducted ?	3	6	13
	Once	Twice	3Times
8) Flow is the frequency of the above ?	7		15
9) Are the records for inspection/breakdown available ?	3	6	13
	Unknown		

(8) Location

1) Distance

	Number of Establishments
1 ~ 50km	2
51 ~ 100km	
101 ~ 150km	
151 ~ 200km	
201 km ~	20
Unknown	

2) Time required

		Number of Establishments
by car	0 ~ 1 hour	1
	1 ~ 2 "	1
	2 ~ 3 "	
	3 ~ 4 "	
	5 hours and more	
by ship	0 ~ 1 hour	
	1 ~ 2 "	
	2 ~ 3 "	
	3 ~ 4 "	
	5 hours and more	
by train	0 ~ 1 hour	
	1 ~ 2 "	
	2 ~ 3 "	
	3 ~ 4 "	
	5 hours and more	
Unknown		20

6. Future Plan (Linkage-type)..... (Q II, IV)

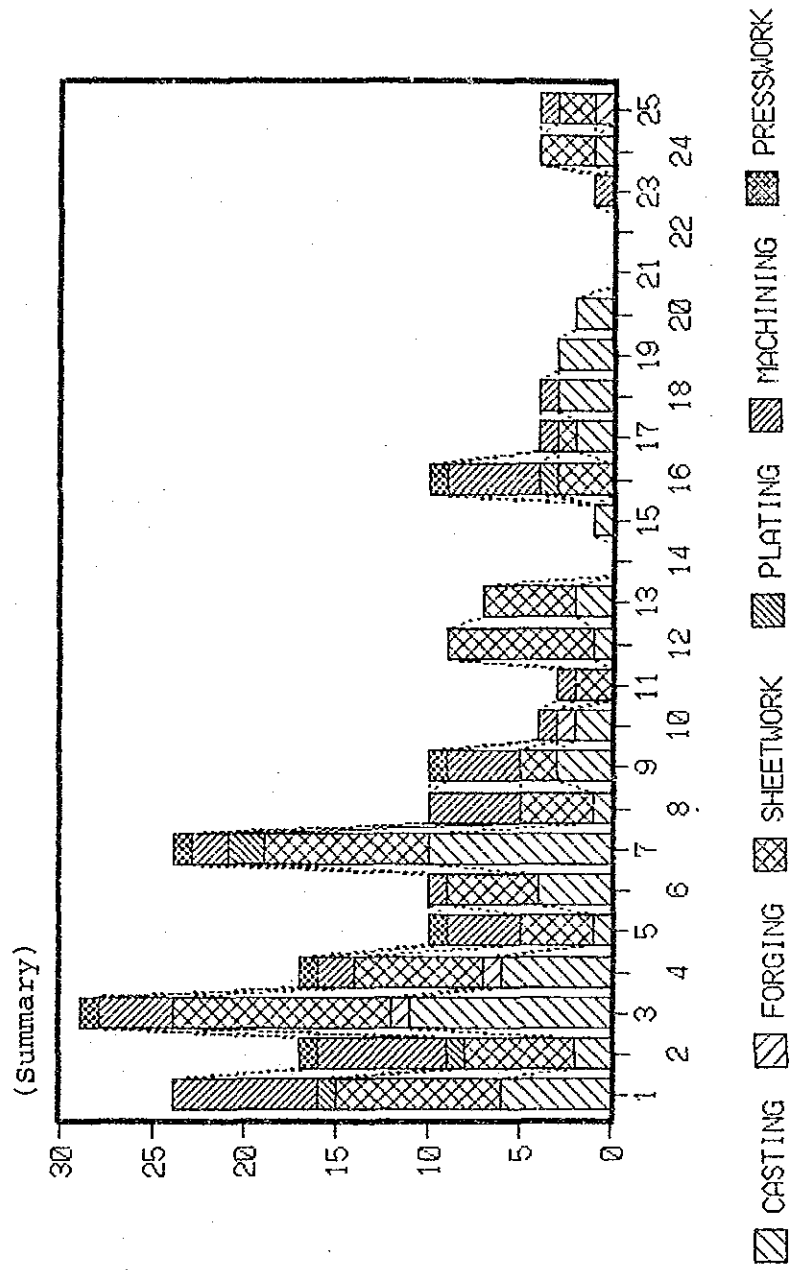
Category	Item	Number of Establishments
Facilities	New Procurement	2
	Additional Installation	3
	Renewal	
	Others	
Techniques	Automatization of facilities	3
	More precise processing	2
	Others	
Aimed fields	Machine tool	2
	Agricultural machine	3
	Construction machine	1
	Car	
	Auto-bicycle and -tricycle	
	Electrical machine	
	Electrical tool	
	Shipbuilding	
	Plant machinery	2
	General-use diesel engine	
	Pump	2
	Others	

7. In-House Training System (Linkage-type) (Q II, V)

Description		Answer		Unknown
		Yes	No	
1) OJT System	Available	9	6	7
	Functioning	4	4	14
2) In-House Qualification System	Available		11	11
	Functioning		7	15
3) Official Qualification System	Supports to obtain official qualifications		11	11
	Personnel has been officially qualified		10	12
4) Facilities	Training facilities are available		13	9
	Training is entrusted to other organization	1	10	11

8. Request to the Center

(1) Tests and Inspections ever entrusted to the existing institutions



Note: Some establishments have entrusted multiple tests/inspections to the outside institutions.

Assembly-type: 66 Linkage-type: 22

	*		**									
	YES	1	2	3	4	5	6	NO	1	2	3	4
1 Brinell Hardness	19	6	0	9	1	8	0	20	8	0	0	9
2 Vickeers Hardness	13	2	0	6	1	7	1	22	13	0	0	6
3 Tensile	29	11	1	12	0	4	1	17	9	0	0	6
4 Impact	16	6	1	7	0	2	1	21	14	1	0	4
5 Projector	8	1	0	4	0	4	1	22	15	0	1	4
6 Micro Structure	12	4	0	5	0	1	0	22	12	0	1	7
7 Chemical Analysis	22	10	0	9	2	2	1	20	10	0	0	6
8 Surface Roughness	12	1	0	4	0	5	0	18	9	0	0	8
9 Three Dimension Measurement	8	3	0	2	0	4	1	23	17	0	1	3
10 Gear Tooth Demension	3	2	1	0	0	1	0	24	16	0	2	4
11 Magnetic Particle	4	0	0	2	0	1	0	26	17	3	1	3
12 Ultra Sonic	11	1	0	8	0	0	0	25	16	3	1	3
13 X-ray	8	2	0	5	0	0	0	25	14	3	2	4
14 Calibration Surface Temp Tester	2	0	0	0	0	0	0	23	15	1	2	3
15 Calibration of Thermo Couple	4	1	0	0	0	0	0	20	13	0	1	4
16 Calibration of Demension Measurement Tool	10	0	0	3	1	5	1	18	10	0	1	5
17 Calibration of Ultra Sonic Tester	7	2	0	1	0	1	0	21	18	0	0	3
18 Sand Grain Fineness Distribution	5	3	0	0	0	1	0	21	15	0	0	4
19 Mold Sand Parmiability Test	4	3	0	0	0	0	0	21	15	0	0	4
20 Moisture	3	2	0	0	0	0	0	22	17	0	0	4
21 Scanning Electron Micro Analyser	1	0	0	0	0	0	0	23	19	0	1	1
22 Electro Micro Analyser	1	0	0	0	0	0	0	23	19	0	1	1
23 Dynamic Balance Test	2	0	0	0	0	1	0	23	17	0	3	1
24 Air Tightness Hydrostatic Test	4	1	0	3	0	0	0	21	16	0	0	3
25 Other	5	0	1	2	0	1	0	13	10	0	0	1

* : 1. Casting
2. Forging
3. Sheetwork & Welding
4. Plating
5. Machining & Machine Assembly
6. Presswork

** : 1. No need
2. Not located nearby
3. Too expensive
4. Inspected at your own factory

Region: DKI Jakarta

Assembly-type: 38 Linkage: 2

	YES	1	2	3	4	5	6	NO	1	2	3	4
1 Brinell Hardness	12	5	0	4	1	6	0	10	3	0	0	6
2 Vickers Hardness	8	2	0	2	1	6	1	10	5	0	0	4
3 Tensile	14	5	1	5	0	3	1	8	3	0	0	5
4 Impact	8	4	1	2	0	1	1	10	7	0	0	3
5 Projector	4	1	0	2	0	2	1	10	7	0	0	3
6 Micro Structure	8	4	0	2	0	0	0	10	4	0	0	5
7 Chemical Analysis	12	6	0	3	2	1	1	10	4	0	0	4
8 Surface Roughness	7	0	0	1	0	4	0	9	3	0	0	7
9 Three Dimension Measurement	7	3	0	1	0	4	1	12	9	0	0	3
10 Gear Tooth Demension	3	2	1	0	0	1	0	13	9	0	1	3
11 Magnetic Particle	3	0	0	1	0	1	0	14	9	1	1	3
12 Ultra Sonic	6	1	0	3	0	0	0	14	9	1	1	3
13 X-ray	4	2	0	1	0	0	0	14	7	1	2	4
14 Calibration Surface Temp Tester	2	0	0	0	0	0	0	12	7	0	2	3
15 Calibration of Thermo Couple	3	0	0	0	0	0	0	11	6	0	1	4
16 Calibration of Demension Measurement Tool	7	0	0	2	1	2	1	9	3	0	1	5
17 Calibration of Ultra Sonic Tester	5	1	0	0	0	1	0	13	11	0	0	3
18 Sand Grain Fineness Distribution	2	1	0	0	0	0	0	13	9	0	0	3
19 Mold Sand Parmiability Test	2	1	0	0	0	0	0	13	9	0	0	3
20 Moisture	2	1	0	0	0	0	0	12	8	0	0	4
21 Scanning Electron Micro Analyser	1	0	0	0	0	0	0	13	10	0	1	1
22 Electro Micro Analyser	1	0	0	0	0	0	0	13	10	0	1	1
23 Dynamic Balance Test	1	0	0	0	0	0	0	13	9	0	2	1
24 Air Tightness Hydrostatic Test	1	0	0	0	0	0	0	12	9	0	0	2
25 Other	4	0	1	2	0	0	0	7	6	0	0	1

Region: Jawa Barat

Assembly-type: 4 Linkage: 8

	YES	1	2	3	4	5	6	NO	1	2	3	4
1 Brinell Hardness	2	0	0	0	0	0	0	3	1	0	0	4
2 Vickers Hardness	2	0	0	0	0	0	0	3	1	0	0	2
3 Tensile	3	1	0	0	0	0	0	2	1	0	0	2
4 Impact	1	0	0	0	0	0	0	3	2	0	0	1
5 Projector	0	0	0	0	0	0	0	3	2	0	0	1
6 Micro Structure	0	0	0	0	0	0	0	4	2	0	0	2
7 Chemical Analysis	2	0	0	0	0	0	0	3	1	0	0	2
8 Surface Roughness	1	1	0	0	0	0	0	1	1	0	0	0
9 Three Dimension Measurement	0	0	0	0	0	0	0	2	2	0	0	0
10 Gear Tooth Demension	0	0	0	0	0	0	0	2	2	0	0	0
11 Magnetic Particle	0	0	0	0	0	0	0	2	2	0	0	0
12 Ultra Sonic	0	0	0	0	0	0	0	2	2	0	0	0
13 X-ray	0	0	0	0	0	0	0	2	2	0	0	0
14 Calibration Surface Temp Tester	0	0	0	0	0	0	0	2	2	0	0	0
15 Calibration of Thermo Couple	0	0	0	0	0	0	0	2	2	0	0	0
16 Calibration of Demension Measurement Tool	1	0	0	0	0	1	0	2	2	0	0	0
17 Calibration of Ultra Sonic Tester	1	1	0	0	0	0	0	2	2	0	0	0
18 Sand Grain Fineness Distribution	1	1	0	0	0	0	0	2	2	0	0	0
19 Mold Sand Permiability Test	1	1	0	0	0	0	0	2	2	0	0	0
20 Moisture	1	1	0	0	0	0	0	2	2	0	0	0
21 Scanning Electron Micro Analyser	0	0	0	0	0	0	0	2	2	0	0	0
22 Electro Micro Analyser	0	0	0	0	0	0	0	2	2	0	0	0
23 Dynamic Balance Test	0	0	0	0	0	0	0	2	2	0	0	0
24 Air Tightness Hydrostatic Test	0	0	0	0	0	0	0	2	2	0	0	0
25 Other	0	0	0	0	0	0	0	1	0	0	0	1

Region: Jawa Tengah

Assembly-type: 9 Linkage: 11

	YES	1	2	3	4	5	6	NO	1	2	3	4
1 Brinell Hardness	1	0	0	0	0	1	0	4	3	0	0	4
2 Vickers Hardness	1	0	0	0	0	1	0	4	4	0	0	1
3 Tensile	5	3	0	1	0	1	0	3	3	0	0	0
4 Impact	4	2	0	1	0	1	0	4	3	1	0	0
5 Projector	2	0	0	0	0	2	0	4	3	0	1	0
6 Micro Structure	1	0	0	0	0	1	0	3	3	0	0	0
7 Chemical Analysis	4	2	0	1	0	1	0	3	3	0	0	0
8 Surface Roughness	1	0	0	0	0	1	0	3	3	0	0	0
9 Three Dimension Measurement	0	0	0	0	0	0	0	4	3	0	0	0
10 Gear Tooth Demension	0	0	0	0	0	0	0	4	3	0	1	0
11 Magnetic Particle	0	0	0	0	0	0	0	4	4	0	0	1
12 Ultra Sonic	0	0	0	0	0	0	0	4	4	0	0	0
13 X-ray	0	0	0	0	0	0	0	4	4	0	0	0
14 Calibration Surface Temp Tester	0	0	0	0	0	0	0	4	4	0	0	0
15 Calibration of Thermo Couple	1	1	0	0	0	0	0	2	2	1	0	0
16 Calibration of Demension Measurement Tool	0	0	0	0	0	0	0	3	3	0	0	0
17 Calibration of Ultra Sonic Tester	0	0	0	0	0	0	0	4	4	0	0	0
18 Sand Grain Fineness Distribution	0	0	0	0	0	0	0	4	3	0	0	1
19 Mold Sand Permiability Test	0	0	0	0	0	0	0	4	3	0	0	1
20 Moisture	0	0	0	0	0	0	0	4	4	0	0	0
21 Scanning Electron Micro Analyser	0	0	0	0	0	0	0	4	4	0	0	0
22 Electro Micro Analyser	0	0	0	0	0	0	0	4	4	0	0	0
23 Dynamic Balance Test	0	0	0	0	0	0	0	4	4	0	0	0
24 Air Tightness Hydrostatic Test	0	0	0	0	0	0	0	4	3	0	0	1
25 Other	1	0	0	0	0	1	0	1	1	0	0	1

Region: Jawa Timur

Assembly-type: 4 Linkage: 1

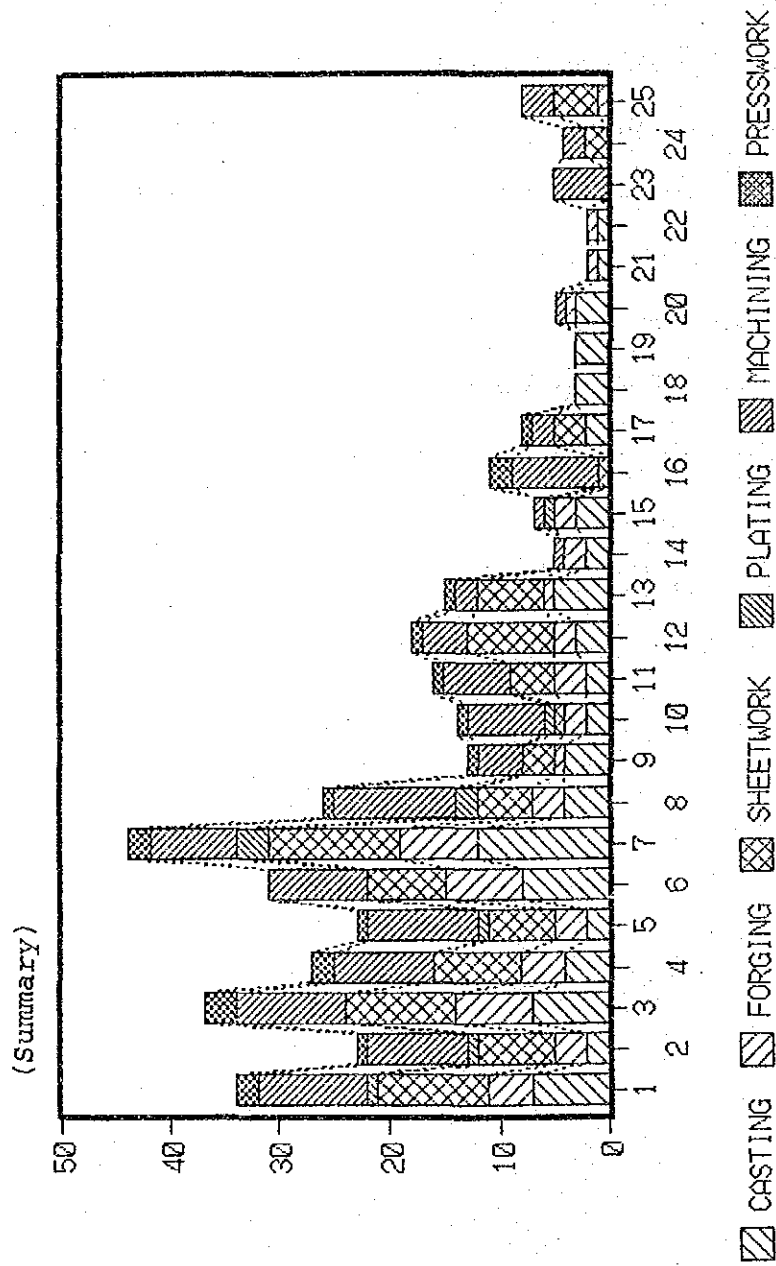
	YES	1	2	3	4	5	6	NO	1	2	3	4
1 Brinell Hardness	0	0	0	0	0	0	0	0	0	0	0	0
2 Vickers Hardness	0	0	0	0	0	0	0	0	0	0	0	0
3 Tensile	1	1	0	0	0	0	0	0	0	0	0	0
4 Impact	0	0	0	0	0	0	0	0	0	0	0	0
5 Projector	0	0	0	0	0	0	0	0	0	0	0	0
6 Micro Structure	1	0	0	1	0	0	0	0	0	0	0	0
7 Chemical Analysis	1	1	0	0	0	0	0	0	0	0	0	0
8 Surface Roughness	0	0	0	0	0	0	0	0	0	0	0	0
9 Three Dimension Measurement	0	0	0	0	0	0	0	0	0	0	0	0
10 Gear Tooth Demension	0	0	0	0	0	0	0	0	0	0	0	0
11 Magnetic Particle	0	0	0	0	0	0	0	0	0	0	0	0
12 Ultra Sonic	1	0	0	1	0	0	0	0	0	0	0	0
13 X-ray	1	0	0	1	0	0	0	0	0	0	0	0
14 Calibration Surface Temp Tester	0	0	0	0	0	0	0	0	0	0	0	0
15 Calibration of Thermo Couple	0	0	0	0	0	0	0	0	0	0	0	0
16 Calibration of Demension Measurement Tool	1	0	0	1	0	1	0	0	0	0	0	0
17 Calibration of Ultra Sonic Tester	0	0	0	0	0	0	0	0	0	0	0	0
18 Sand Grain Fineness Distribution	0	0	0	0	0	0	0	0	0	0	0	0
19 Mold Sand Permiability Test	0	0	0	0	0	0	0	0	0	0	0	0
20 Moisture	0	0	0	0	0	0	0	0	0	0	0	0
21 Scanning Electron Micro Analyser	0	0	0	0	0	0	0	0	0	0	0	0
22 Electro Micro Analyser	0	0	0	0	0	0	0	0	0	0	0	0
23 Dynamic Balance Test	0	0	0	0	0	0	0	0	0	0	0	0
24 Air Tightness Hydrostatic Test	1	1	0	1	0	0	0	0	0	0	0	0
25 Other	0	0	0	0	0	0	0	0	0	0	0	0

Region: Sumatera

Assembly-type: 11 Linkage: 0

	YES	1	2	3	4	5	6	NO	1	2	3	4
1 Brinell Hardness	4	1	0	3	0	1	0	3	1	0	0	4
2 Vickers Hardness	2	0	0	2	0	0	0	0	1	0	0	0
3 Tensile	6	1	0	4	0	0	0	0	3	0	0	0
4 Impact	3	0	0	3	0	0	0	0	2	0	0	0
5 Projector	2	0	0	2	0	0	0	0	3	0	0	0
6 Micro Structure	2	0	0	2	0	0	0	0	3	0	1	0
7 Chemical Analysis	3	1	0	3	0	0	0	0	3	0	0	0
8 Surface Roughness	3	0	0	3	0	0	0	0	2	0	0	1
9 Three Dimension Measurement	1	0	0	1	0	0	0	0	3	0	0	0
10 Gear Tooth Demension	0	0	0	0	0	0	0	0	2	0	1	0
11 Magnetic Particle	1	0	0	1	0	0	0	0	2	2	0	0
12 Ultra Sonic	4	0	0	4	0	0	0	0	1	2	0	0
13 X-ray	3	0	0	3	0	0	0	0	1	2	0	0
14 Calibration Surface Temp Tester	0	0	0	0	0	0	0	0	3	0	0	0
15 Calibration of Thermo Couple	0	0	0	0	0	0	0	0	3	0	0	0
16 Calibration of Demension Measurement Tool	1	0	0	0	0	1	0	0	2	0	0	0
17 Calibration of Ultra Sonic Tester	1	0	0	1	0	0	0	0	1	0	0	0
18 Sand Grain Fineness Distribution	2	1	0	0	0	1	0	0	1	0	0	0
19 Mold Sand Permiability Test	1	1	0	0	0	0	0	0	1	0	0	0
20 Moisture	0	0	0	0	0	0	0	0	3	0	0	0
21 Scanning Electron Micro Analyser	0	0	0	0	0	0	0	0	3	0	0	0
22 Electro Micro Analyser	0	0	0	0	0	0	0	0	3	0	0	0
23 Dynamic Balance Test	1	0	0	0	0	1	0	0	2	0	1	0
24 Air Tightness Hydrostatic Test	2	0	0	2	0	0	0	0	3	0	0	0
25 Other	0	0	0	0	0	0	0	0	4	0	0	0

(2) Tests and Inspections to the Center



Note: Some establishments wish to entrust multiple tests/inspections to the Center.

	YES	1	2	3	4	5	6	NO	1	2	3	4	5	6	XX
1 Brinell Hardness	23	7	4	10	1	10	2	14	5	7	10	1	10	2	2
2 Vickers Hardness	18	2	3	7	1	9	1	16	4	5	8	1	9	1	2
3 Tensile	28	7	7	10	0	10	3	13	6	8	12	0	10	3	6
4 Impact	22	4	4	8	0	9	2	14	6	7	9	0	9	2	3
5 Projector	15	2	3	6	1	10	1	16	2	3	9	0	10	1	0
6 Micro Structure	21	8	7	7	0	9	0	14	5	4	11	0	9	0	2
7 Chemical Analysis	28	12	7	12	3	8	2	11	5	9	14	2	11	2	5
8 Surface Roughness	21	4	3	5	2	11	1	13	2	6	9	3	11	1	3
9 Three Dimension Measurement	9	4	1	3	0	4	1	20	2	3	4	1	4	1	1
10 Gear Tooth Demension	7	2	2	1	1	7	1	18	5	3	5	0	7	1	0
11 Magnetic Particle	9	2	3	4	0	6	1	17	4	3	5	1	6	1	2
12 Ultra Sonic	11	3	2	8	0	4	1	19	3	4	5	0	4	1	1
13 X-ray	12	5	1	6	0	2	1	17	3	3	5	0	2	1	2
14 Calibration Surface Temp Tester	6	2	2	0	0	1	0	17	3	0	2	0	1	0	3
15 Calibration of Thermo Couple	8	3	2	0	1	1	0	16	4	0	3	1	1	0	4
16 Calibration of Demension Measurement Tool	13	0	0	1	0	8	2	14	6	2	7	0	8	2	2
17 Calibration of Ultra Sonic Tester	7	2	0	3	0	2	1	16	4	3	0	0	2	1	0
18 Sand Grain Fineness Distribution	4	3	0	0	0	0	0	17	3	0	2	0	0	0	2
19 Mold Sand Parmiability Test	4	3	0	0	0	0	0	17	3	1	0	0	0	0	1
20 Moisture	5	3	1	0	0	1	0	16	1	0	4	0	1	0	2
21 Scanning Electron Micro Analyser	2	1	1	0	0	0	0	18	1	1	1	0	0	0	1
22 Electro Micro Analyser	2	1	1	0	0	0	0	18	2	1	1	0	0	0	1
23 Dynamic Balance Test	6	0	0	0	0	5	0	15	1	3	3	0	5	0	3
24 Air Tightness Hydrostatic Test	4	0	0	2	0	2	0	17	1	1	1	0	2	0	1
25 others	7	0	1	4	0	3	0	8	1	0	7	0	3	0	1

* : 1. Casting
2. Forging
3. Sheetwork & Welding
4. Plating
5. Machining & Machine Assembly
6. Presswork

** : 1. Test facilities are very expensive.
2. Client's requirement
3. Getting authorization
4. Frequency of test is very few.

Region: DKI Jakarta

1	Brinell Hardness	YES	1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
2	Vickeers Hardness		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
3	Tensile		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
4	Impact		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
5	Projector		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
6	Micro Structure		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
7	Chemical Analysis		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
8	Surface Roughness		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
9	Three Dimension Measurement		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
10	Gear Tooth Demension		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
11	Magnetic Particle		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
12	Ultra Sonic		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
13	X-ray		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
14	Calibration Surface Temp Tester		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
15	Calibration of Thermo Couple		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
16	Calibration of Demension Measurement Tool		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
17	Calibration of Ultra Sonic Tester		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
18	Sand Grain Fineness Distribution		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
19	Mold Sand Parniability Test		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
20	Moisture		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
21	Scanning Electron Micro Analyser		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
22	Electro Micro Analyser		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
23	Dynamic Balance Test		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
24	Air Tightness Hydrostatic Test		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4
25	Other		1	4	2	3	3	3	3	3	4	2	5	7	2	2	2	5	10	15	12	8	12	14	10	13	4

[illegible]

	YES	1	2	3	4	5	6 NO	7	8	9	10	11	12	13	14
1 Brinell Hardness	2	0	0	0	0	2	0	0	0	3	0	0	1	2	3
2 Vickers Hardness	2	0	0	0	0	2	0	0	0	3	0	0	1	1	1
3 Tensile	4	1	1	0	0	2	0	0	2	2	1	1	1	2	1
4 Impact	4	1	1	1	0	2	0	0	2	2	1	1	1	2	1
5 Projector	3	0	0	2	0	2	0	0	2	2	0	1	1	2	0
6 Micro Structure	4	1	1	2	0	2	0	0	2	2	1	1	1	3	0
7 Chemical Analysis	5	2	1	2	0	2	0	0	2	2	2	1	1	3	1
8 Surface Roughness	3	0	1	0	0	2	0	0	2	2	0	2	1	1	0
9 Three Dimension Measurement	3	2	0	0	0	2	0	0	2	2	1	1	1	1	0
10 Gear Tooth Demension	1	0	0	0	0	1	0	3	1	1	1	1	0	0	0
11 Magnetic Particle	1	0	0	0	0	1	0	3	1	1	1	1	0	0	0
12 Ultra Sonic	1	0	0	1	0	0	0	3	0	0	1	1	0	0	0
13 X-ray	2	1	0	1	0	0	0	3	0	0	1	1	0	0	0
14 Calibration Surface Temp Tester	2	0	0	0	0	1	0	3	0	0	0	0	1	1	0
15 Calibration of Thermo Couple	2	1	0	0	0	0	0	3	0	0	0	0	1	1	0
16 Calibration of Demension Measurement Tool	3	0	0	0	0	2	0	0	2	0	0	0	2	0	0
17 Calibration of Ultra Sonic Tester	1	0	0	1	0	0	0	3	0	0	1	0	0	0	0
18 Sand Grain Fineness Distribution	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
19 Mold Sand Parmiability Test	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
20 Moisture	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
21 Scanning Electron Micro Analyser	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
22 Electro Micro Analyser	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
23 Dynamic Balance Test	1	0	0	0	0	1	0	3	0	0	1	1	1	0	0
24 Air Tightness Hydrostatic Test	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
25 Other	1	0	0	0	0	1	0	0	1	0	0	0	1	0	0

YES	1	2	3	4	5	6	NO	1	2	3	4
	1	2	0	0	1	0	3	0	1	3	0
	2	0	0	0	0	0	5	0	0	2	0
	3	1	2	3	1	1	4	1	2	3	0
	4	0	0	0	1	0	4	1	1	2	0
	5	0	0	0	0	0	5	0	0	2	0
	6	1	1	2	0	0	4	1	0	2	0
	7	1	1	2	0	0	4	1	0	2	1
	8	2	1	3	0	0	3	0	2	2	1
	9	1	0	2	1	0	3	1	1	3	0
	10	0	0	1	0	0	4	0	1	0	0
	11	0	0	0	1	0	3	1	0	1	0
	12	1	1	3	0	0	3	1	0	2	0
	13	0	0	5	0	0	3	1	1	3	0
	14	0	0	4	0	0	3	1	1	2	0
	15	1	1	0	0	0	3	0	0	0	1
	16	1	1	0	0	0	3	0	0	0	1
	17	0	0	0	1	0	3	1	1	0	0
	18	0	0	1	0	0	2	1	0	0	0
	19	1	0	0	0	0	3	1	0	0	0
	20	1	0	0	0	0	3	1	0	0	0
	21	1	1	0	1	0	2	0	0	1	0
	22	0	0	0	0	0	3	0	0	0	0
	23	0	0	0	0	0	3	0	0	0	0
	24	0	0	0	1	0	3	0	0	1	0
	25	0	0	1	0	0	3	0	1	0	0
	Other	0	0	2	0	0	3	0	0	2	0

(3) Trial Product

	Past Activity		Intension to use the Center			
	YES	NO	1	2	3	4 NO
<u>Summary</u>						
1 Engine Lath Machining	2	20	12	1	2	1
2 C N C Machining	3	19	12	0	0	3
3 Horizontal Milling Machining	1	21	14	1	1	4
4 Surface Grinder Machining	4	17	13	0	0	4
5 Working By Electric Discharge Machining	1	18	13	0	1	1
6 Cutting and Welding by Plasma Arc	1	17	13	1	2	2
7 Electron Beam Welding	0	16	13	0	1	1
8 Surface Hardening by Carbonizing	1	15	11	1	2	2
9 Surface Work by CVD,BVD and Plasma Spraying	0	20	15	0	2	5
10 Powder Metal Forging	0	20	15	0	0	1
11 Manufacture Precision Die	1	22	14	1	5	1
12 Presswork with Precision Die	1	20	14	1	4	3

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DKI Jakarta

	YES	NO	1	2	3	4 YES	1	2	3	4 NO
1 Engine Lath Machining	1	12	5	1	1	5	3	1	0	0
2 C N C Machining	2	11	5	0	0	5	5	3	0	8
3 Horizontal Milling Machining	1	13	7	1	1	4	4	1	0	9
4 Surface Grinder Machining	3	9	6	0	0	2	5	3	0	7
5 Working By Electric Discharge Machining	1	8	6	0	1	0	2	2	0	5
6 Cutting and Welding by Plasma Arc	1	9	6	1	2	0	3	3	0	6
7 Electron Beam Welding	0	8	6	0	1	0	2	2	0	6
8 Surface Hardening by Carbonizing	1	7	4	1	2	0	6	4	0	4
9 Surface Work by CVD,BVD and Plasma Spraying	0	9	7	0	1	0	2	2	0	6
10 Powder Metal Forging	0	9	7	0	1	0	2	2	0	6
11 Manufacture Precision Die	1	10	7	1	3	0	6	5	0	5
12 Presswork with Precision Die	1	9	7	1	2	0	5	4	0	4

- * : 1. Not necessary
2. Not located nearby
3. Too expensive
4. Factory-made
- ** : 1. Your factory does not have facilities.
2. Client's requirement
3. Your factory is not capable of processing.
4. Frequency of request to the Center is very low.

Jawa Barat

	YES	NO	1	2	3	4	YES	1	2	3	4	NO
1 Engine Lath Machining	0	2	2	0	0	0	0	0	0	0	0	2
2 C N C Machining	0	2	2	0	0	0	0	0	0	0	0	0
3 Horizontal Milling Machining	0	2	2	0	0	0	0	0	0	0	0	0
4 Surface Grinder Machining	0	2	2	0	0	0	0	0	0	0	0	1
5 Working By Electric Discharge Machining	0	2	2	0	0	0	0	0	0	0	0	2
6 Cutting and Welding by Plasma Arc	0	2	2	0	0	0	0	0	0	0	0	1
7 Electron Beam Welding	0	2	2	0	0	0	0	0	0	0	0	1
8 Surface Hardening by Carbonizing	0	2	2	0	0	0	0	0	0	0	0	1
9 Surface Work by CVD, BVD and Plasma Spraying	0	2	2	0	0	0	0	0	0	0	0	1
10 Powder Metal, Forging	0	2	2	0	0	0	0	0	0	0	0	2
11 Manufacture Precision Die	0	3	2	0	0	0	1	2	0	0	2	1
12 Presswork with Precision Die	0	2	2	0	0	0	0	2	0	0	2	0

Jawa Tengah

	YES	NO	1	2	3	4	YES	1	2	3	4	NO
1 Engine Lath Machining	0	3	3	0	0	0	2	0	0	1	0	3
2 C N C Machining	0	3	3	0	0	0	3	1	0	1	0	2
3 Horizontal Milling Machining	0	3	3	0	0	0	2	0	0	1	0	3
4 Surface Grinder Machining	0	3	3	0	0	0	2	0	0	1	0	3
5 Working By Electric Discharge Machining	0	3	3	0	0	0	1	0	0	1	0	3
6 Cutting and Welding by Plasma Arc	0	3	3	0	0	0	2	1	0	1	0	2
7 Electron Beam Welding	0	3	3	0	0	0	2	1	0	1	0	2
8 Surface Hardening by Carbonizing	0	3	3	0	0	0	2	1	0	1	0	2
9 Surface Work by CVD, BVD and Plasma Spraying	0	5	4	0	0	0	1	1	0	0	0	3
10 Powder Metal, Forging	0	5	4	0	0	0	1	1	0	0	0	3
11 Manufacture Precision Die	0	5	3	0	1	1	2	2	0	0	0	2
12 Presswork with Precision Die	0	5	3	0	1	1	2	2	0	0	0	2

Jawa Timur

	YES	NO	1	2	3	4	YES	1	2	3	4	NO
1 Engine Lath Machining	0	0	0	0	0	0	0	0	0	0	0	0
2 C N C Machining	0	0	0	0	0	0	0	0	0	0	0	0
3 Horizontal Milling Machining	0	0	0	0	0	0	0	0	0	0	0	0
4 Surface Grinder Machining	0	0	0	0	0	0	0	0	0	0	0	0
5 Working By Electric Discharge Machining	0	0	0	0	0	0	0	0	0	0	0	0
6 Cutting and Welding by Plasma Arc	0	0	0	0	0	0	0	0	0	0	0	0
7 Electron Beam Welding	0	0	0	0	0	0	0	0	0	0	0	0
8 Surface Hardening by Carbonizing	0	0	0	0	0	0	0	0	0	0	0	0
9 Surface Work by CVD, BVD and Plasma Spraying	0	1	0	0	1	0	1	1	0	1	0	0
10 Powder Metal, Forging	0	1	0	0	1	0	1	1	0	1	0	0
11 Manufacture Precision Die	0	1	0	0	1	0	1	1	0	1	0	0
12 Presswork with Precision Die	0	1	0	0	1	0	1	1	0	1	0	0

Sumatera

	YES	NO	1	2	3	4	YES	1	2	3	4	NO
1 Engine Lath Machining	1	3	2	0	0	0	1	0	0	0	1	3
2 C N C Machining	1	3	2	0	0	0	1	0	1	0	0	3
3 Horizontal Milling Machining	0	3	2	0	0	0	1	0	0	0	1	3
4 Surface Grinder Machining	1	3	2	0	0	0	1	0	1	0	0	3
5 Working By Electric Discharge Machining	0	3	2	0	0	0	1	0	0	0	1	3
6 Cutting and Welding by Plasma Arc	0	3	2	0	0	0	1	0	1	0	0	3
7 Electron Beam Welding	0	3	2	0	0	0	1	0	0	0	1	3
8 Surface Hardening by Carbonizing	0	3	2	0	0	0	1	0	0	0	1	3
9 Surface Work by CVD, BVD and Plasma Spraying	0	3	2	0	0	0	1	0	0	0	1	3
10 Powder Metal, Forging	0	3	2	0	0	0	1	0	1	0	0	3
11 Manufacture Precision Die	0	3	2	0	0	0	1	0	1	0	0	3
12 Presswork with Precision Die	0	3	2	0	0	0	1	0	1	0	0	3

(4) Training

	Past Activity		Intention to use the Center			
	YES	NO*	1	2	3	4
Summary						
1 CNC NC Machining	3	23	14	0	1	3
2 CAD/CAM	0	22	16	0	1	1
3 Casting Technique	6	22	14	2	0	2
4 Forging Technique	1	20	15	1	0	0
5 Heat Treatment Technique	2	20	13	1	2	1
6 Carbonizing and Nitriding Technique	2	20	13	0	2	1
7 Induction Hardening and Flame Hardening	1	20	14	0	2	0
8 Plating Technique	2	18	14	0	0	0
9 Sheetworking Pressforming Technique	3	23	14	0	2	3
10 Welding Technique	9	22	12	0	1	3
11 Other	4	9	3	0	0	1

	Past Activity		Intention to use the Center			
	YES	NO	1	2	3	4
DKI Jakarta						
1 CNC NC Machining	2	12	7	0	0	3
2 CAD/CAM	0	10	7	0	1	1
3 Casting Technique	0	11	7	1	0	2
4 Forging Technique	0	9	7	1	0	0
5 Heat Treatment Technique	1	9	6	1	1	1
6 Carbonizing and Nitriding Technique	2	9	6	0	1	1
7 Induction Hardening and Flame Hardening	1	9	7	0	1	0
8 Plating Technique	1	8	7	0	0	0
9 Sheetworking Pressforming Technique	1	12	7	0	1	3
10 Welding Technique	3	12	6	0	1	2
11 Other	1	4	2	0	0	0

- * : 1. Not necessary
 2. Not located nearby
 3. Too expensive
 4. Education and training are conducted at your own factory.
- ** : 1. Education and training facilities are very expensive.
 2. Client's requirement
 3. Getting authorization
 4. Frequency of education and training is very few.

Jawa Barat												
	YES	NO	1	2	3	4	YES	1	2	3	4	NO
1 CNC NC Machining	0	2	2	0	0	0	1	0	0	0	1	1
2 CAD/CAM	0	2	2	0	0	0	0	0	0	0	0	2
3 Casting Technique	0	3	3	0	0	0	0	0	0	0	0	3
4 Forging Technique	0	2	2	0	0	0	0	0	0	0	0	2
5 Heat Treatment Technique	0	2	2	0	0	0	0	0	0	0	0	2
6 Carbonizing and Nitriding Technique	0	2	2	0	0	0	0	0	0	0	0	2
7 Induction Hardening and Flame Hardening	0	2	2	0	0	0	0	0	0	0	0	2
8 Plating Technique	0	2	2	0	0	0	0	0	0	0	0	2
9 Sheetworking Pressforming Technique	1	2	2	0	0	0	1	1	0	0	0	2
10 Welding Technique	1	2	2	0	0	0	1	1	0	0	0	2
11 Other	1	1	0	0	0	0	1	1	0	0	0	1

Jawa Tengah												
	YES	NO	1	2	3	4	YES	1	2	3	4	NO
1 CNC NC Machining	0	4	3	0	1	0	3	2	0	0	0	2
2 CAD/CAM	0	4	4	0	0	0	3	2	0	0	0	2
3 Casting Technique	3	4	3	1	0	0	6	3	0	0	1	3
4 Forging Technique	0	4	4	0	0	0	2	0	0	0	0	4
5 Heat Treatment Technique	0	4	3	0	1	0	3	1	0	0	0	3
6 Carbonizing and Nitriding Technique	0	4	3	0	1	0	3	1	0	0	0	3
7 Induction Hardening and Flame Hardening	0	4	3	0	1	0	4	2	0	0	0	3
8 Plating Technique	1	3	3	0	0	0	3	1	0	0	0	3
9 Sheetworking Pressforming Technique	0	4	3	0	1	0	3	0	0	1	1	2
10 Welding Technique	1	3	3	0	0	0	3	0	0	0	1	2
11 Other	1	0	0	0	0	0	0	0	0	0	0	0

Jawa Timur

	YES	NO	1	2	3	4	YES	1	2	3	4	NO
1 CNC NC Machining	0	1	0	0	0	0	1	1	0	0	0	0
2 CAD/CAM	0	1	0	0	0	0	1	1	0	0	0	0
3 Casting Technique	1	1	0	0	0	0	2	2	0	0	0	0
4 Forging Technique	0	1	0	0	0	0	1	1	0	0	0	0
5 Heat Treatment Technique	0	1	0	0	0	0	1	1	0	0	0	0
6 Carbonizing and Nitriding Technique	0	1	0	0	0	0	1	1	0	0	0	0
7 Induction Hardening and Flame Hardening	0	1	0	0	0	0	1	1	0	0	0	0
8 Plating Technique	0	1	0	0	0	0	1	1	0	0	0	0
9 Sheetworking Pressforming Technique	0	1	0	0	0	0	1	1	0	0	0	0
10 Welding Technique	0	1	0	0	0	0	1	1	0	1	1	0
11 Other	1	0	0	0	0	0	0	0	0	0	0	0

Sumatera

	YES	NO	1	2	3	4	YES	1	2	3	4	NO
1 CNC NC Machining	1	4	2	0	0	0	1	0	0	0	1	4
2 CAD/CAM	0	4	2	0	0	0	1	1	0	0	0	4
3 Casting Technique	2	4	2	0	0	0	4	2	1	2	0	2
4 Forging Technique	1	4	2	0	0	0	3	2	0	1	0	2
5 Heat Treatment Technique	1	4	2	0	0	0	3	1	0	2	0	2
6 Carbonizing and Nitriding Technique	0	4	2	0	0	0	2	1	0	1	0	2
7 Induction Hardening and Flame Hardening	0	4	2	0	0	0	3	1	0	1	1	2
8 Plating Technique	0	4	2	0	0	0	3	1	0	1	1	2
9 Sheetworking Pressforming Technique	1	4	2	0	0	0	3	1	0	2	0	3
10 Welding Technique	3	4	1	0	0	0	5	1	1	1	1	2
11 Other	1	4	1	0	0	0	4	1	1	0	1	2

ANNEX III.

DELETION PROGRAM

ANNEX III. DELETION PROGRAM

Item	Decree of the Minister of Industry
(1) Parts and accessories as well as Sub Components Schedule for Deletion (i) For Two-wheel Motor Vehicles (ii) For Commercial Cars (iii) For Power Tillers (Single Axle Hand Tractors) (iv) For Mini Tractors (v) For Automobile Shock Absorbers (vi) For Automobile and Heavy Equipment Radiators	No. 34/M/SK/2/1989 Dated: February 2, 1987
(2) Schedule of the Domestically Manufactured Components Utilization in Assembling Diesel Motor of 2 through 25 KW Capacity	No. 198/M/SK/6/1983 Dated: June 9, 1983
(3) Utilization Schedule of Domestically Manufactured Components in Assembling Diesel Motor of 26 through 375 KW Capacity	No. 202/M/SK/6/1983 Dated: June 9, 1983
(4) Schedule for Machining Tool Production	No. 28/M/SK/1/1985 Dated: January 21, 1985

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(1) Parts and Accessories as well as Sub components of
Two-wheel Motor Vehicles Scheduled for Deletion.

NO.	COMPONENTS	SCHEDULES	REMARKS
	ENGINE ASSY GROUP		
1.	Covers	October 1, 1987	*)
2.	Rubber parts for engine	October 1, 1987	*)
3.	Plastic parts	October 1, 1987	*)
4.	Gasket	October 1, 1987	*)
5.	Bearings	October 1, 1987	*)
6.	Springs	October 1, 1987	*)
7.	Pedal gear chain	October 1, 1987	*)
8.	Cylinder head	October 1, 1988	
9.	Cylinder Block	October 1, 1988	
10.	Piston	October 1, 1988	
11.	Kick starter pedal	October 1, 1988	
12.	Fly wheel	October 1, 1988	
13.	Piston ring	October 1, 1988	*)
14.	Fuel cock	October 1, 1988	*)
15.	Oil filter	October 1, 1988	*)
16.	Crank case	October 1, 1988	
17.	Piston pin	October 1, 1989	
18.	Crank pin	October 1, 1989	
19.	Cylinder sleeve	October 1, 1989	
20.	Cam shaft	October 1, 1989	
21.	Cam chain tensioner	October 1, 1989	*)
22.	Crank shaft	October 1, 1990	
23.	Connecting rod	October 1, 1990	
24.	Kick starter system	October 1, 1990	
25.	Valves assy	October 1, 1990	
26.	Oil pump	October 1, 1990	*)

NO.	COMPONENTS	SCHEDULES	REMARKS
	TRANSMISSION ASSY GROUP		
27.	Drive chain	October 1, 1987	*)
28.	Sprocket rear	October 1, 1987	*)
29.	Sprocket (drive)	October 1, 1989	
30.	Gear change	October 1, 1989	
31.	Main gears	October 1, 1990	
32.	Counter gear (Spring gear)	October 1, 1990	
33.	Main shaft	October 1, 1990	
34.	Counter shaft	October 1, 1990	
	CLUTCH ASSY GROUP		
35.	Clutch	October 1, 1990	*)
	ELECTRICAL GROUP		
36.	Contact breaker	October 1, 1989	*)
37.	Spark advancer	October 1, 1989	*)
38.	Electric starter	October 1, 1990	*)
39.	Generator assy	October 1, 1990	*)
40.	Magneto coil	October 1, 1990	*)
	BRAKE SYSTEM GROUP		
41.	Disc brake & caliper	October 1, 1990	*)
	FRAME BODY GROUP		
42.	Emblem/name plate	October 1, 1990	*)

*) Outhouse manufacturing, depending on the presence of suppliers or sub-contractors and quality requirements.

11. PARTS AND ACCESSORIES AS WELL AS SUB COMPONENTS OF COMMERCIAL CARS SCHEDULED FOR DELETION.

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NO.	COMPONENTS	SCHEDULES	REMARKS
	ENGINE ASSY GROUP		
1.	Intake manifold	January 1, 1987	Cat. I, machining.
2.	Exhaust manifold	January 1, 1987	Cat. I, machining.
		January 1, 1988	Cat. I casting.
3.	Cover, cylinder head	January 1, 1987	Cat. I machining.
4.	Fan belt	July 1, 1987	Cat. I, II, III, IV.
5.	Bearing cap	January 1, 1988	Cat. I, machining.
6.	Cylinder block	January 1, 1988	Cat. I, machining.
7.	Gasket	January 1, 1988	Cat. I, II, III, IV, cylinder head.
8.	Motor starter	January 1, 1988	Cat. I, II, III, IV.
9.	Alternator	January 1, 1988	Cat. I, II, III, IV.
10.	Cylinder head	January 1, 1989	Cat. I, machining.
11.	Cam shaft holder	January 1, 1989	Cat. I, machining.
12.	Rocker arm	January 1, 1990	Cat. I, machining.
13.	Connecting rod	January 1, 1990	Cat. I, machining.

NO.	COMPONENTS	SCHEDULES	REMARKS
14.	Cam shaft	January 1, 1990	Cat. 1, machining
15.	Crank shaft	January 1, 1990	Cat. 1, machining.
16.	Timing pulley	January 1, 1990	Cat. 1, machining.
	TRANSMISSION ASSY GROUP		
17.	Speedometer gear	October 1, 1987	Cat. 1, machining.
18.	Front bearing retainer	April 1, 1988	Cat. 1, machining.
19.	Transmission cover.	April 1, 1988	Cat. 1, machining.
20.	Transmission case	April 1, 1988	Cat. 1, machining.
21.	Extension housing	April 1, 1988	Cat. 1, machining.
22.	Clutch housing	April 1, 1988	Cat. 1, machining.
23.	Counter gear shaft	July 1, 1988	Cat. 1, machining.
24.	Reverse idler gear shaft	July 1, 1988	Cat. 1, machining.
25.	Speed shaft rail/fork	July 1, 1988	Cat. 1, machining.
26.	Reverse gear	July 1, 1988	Cat. 1, machining.
27.	Reverse idler gear	July 1, 1988	Cat. 1, machining.
28.	First speed gear	January 1, 1990	Cat. 1, machining.
29.	Second speed gear	January 1, 1990	Cat. 1, machining.
30.	1-2 synchronizer hub	January 1, 1990	Cat. 1, machining.
31.	1-2 synchronizer sleeve	January 1, 1990	Cat. 1, machining.

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NO.	COMPONENTS	SCHEDULES	REMARKS
32.	Main shaft (output shaft)	Jan. 1, 1990	Cat. 1, ma chining.
33.	Third speed gear	Jan. 1, 1990	Cat. 1, ma chining.
34.	3-4 speed syn- chronizer hub	Jan. 1, 1990	Cat. 1, ma chining.
35.	3-4 Speed syn- chronizer sleeve	Jan. 1, 1990	Cat. 1, ma chining.
36.	Counter gear	Jan. 1, 1990	Cat. 1, ma chining.
37.	Input shaft gear	Jan. 1, 1990	Cat. 1, ma chining.
38.	Synchronizer ring (1-2)	Jan. 1, 1990	Cat. 1, ma
	CLUTCH ASSY GROUP.		
39.	Torsion spring	July 1, 1987	Cat. 1.
40.	Strap.	July 1, 1987	Cat. 1.
41.	Pressure plate	October 1, 1987	Cat. 1.
42.	Disc plate	Jan. 1, 1988	Cat. 1.
43.	Splined hub	Jan. 1, 1988	Cat. 1, ma chining.
44.	Facing	Jan. 1, 1988	Cat. 1,
45.	Spring seat	Jan. 1, 1988	Cat. 1,
46.	Stopper pin	Jan. 1, 1988	Cat. 1.
47.	Friction plate; washer.	Jan. 1, 1988	Cat. 1.
48.	Pivot/wave spring	Jan. 1, 1988	Cat. 1,
49.	Rivet	Jan. 1, 1988	Cat. 1,
50.	Cushion, rubber	Jan. 1, 1988	Cat. 1,
51.	Cover	July 1, 1988	Cat. 1.
	ELECTRICAL GROUP		

NO.	COMPONENTS	SCHEDULES	REMARKS
52.	Battery cable - Climping - Die casting STEERING SYSTEM GROUP.	July 1, 1987 Jan. 1, 1988	
53.	Tube assy	Oct. 1, 1987	Cat. 1
54.	Steering wheel	Oct. 1, 1987	Cat. 1, jig & dies do- mestic pro- ducts.
55.	Tie rod linkage	Jan. 1, 1988	Cat. 1.
56.	Knuckle arm	Jan. 1, 1988	Cat. 1, ma- chining.
57.	Pitman arm	Jan. 1, 1988	Cat. 1, ma- chining.
58.	Steering shaft	Jan. 1, 1988	Cat. 1, ma- chining.
59.	Steering gear	July 1, 1988	Cat. 1, ma- chining.
60.	Tie rod end AXLE PROPELLER SHAFT GROUP.	Jan. 1, 1989	Cat. 1, ma- chining.
61.	Side bearing nut	Oct. 1, 1987	Cat. 1, ma- chining.
62.	Companion flange	Oct. 1, 1987	Cat. 1, ma- chining.
63.	Propeller tube	Oct. 1, 1987	Cat. 1, ma- chining.
64.	Pinion shaft	July 1, 1988	Cat. 1, ma- chining.
65.	Rear axle shaft	July 1, 1988	Cat. 1, ma- chining.
66.	Rear axle hous- ing	Sept. 1, 1988	Cat. 1, ma- chining.

NO.	COMPONENTS	SCHEDULES	REMARKS
67.	Differential case	Jan. 1, 1989	Cat. 1, machining.
68.	Differential carrier case	Jan. 1, 1989	Cat. 1, machining.
69.	Differential carrier cap	Jan. 1, 1989	Cat. 1, machining.
70.	Tube yoke	Jan. 1, 1989	Cat. 1, machining.
71.	Sleeve Yoke	Jan. 1, 1989	Cat. 1, machining.
72.	Flange Yoke	Jan. 1, 1989	Cat. 1, machining.
73.	Differential side gear	July 1, 1990	Cat. 1, machining.
74.	Differential pinion gear	July 1, 1990	Cat. 1, machining.
75.	Differential drive gear	July 1, 1990	Cat. 1, machining.
76.	Differential drive pinion	July 1, 1990	Cat. 1, machining.
SUSPENSION GROUP :			
77.	Shock absorber	July 1, 1987	Strut type
BRAKE SYSTEM GROUP :			
78.	Sleeve	July 1, 1987	Cat. 1 **)
79.	Guide pin	July 1, 1987	Cat. 1, **)
80.	Support caliper	July 1, 1987	Cat. 1, **)
81.	Backing plate	Sept. 1, 1987	Cat. 1,
82.	Disc	Jan. 1, 1987	Cat. 1, **)
83.	Brake lining	Jan. 1, 1988	Cat. 1, *)
84.	Brake shoe	Jan. 1, 1988	Cat. 1, *)
85.	Disc pad	Jan. 1, 1988	Cat. 1, **)
86.	Body caliper	Jan. 1, 1988	Cat. 1, **)
87.	Cylinder wheel	Jan. 1, 1989	Cat. 1, *)
88.	Piston	Jan. 1, 1989	Cat. 1,
89.	Brake drum	July 1, 1987	Cat. II, IV *)
FRAME BODY GROUP:			
90.	Jack	Jan. 1, 1988	Mechanic and hydraulic
91.	Tools	Jan. 1, 1988	

*) Drum brake
 **) Disc brake.

III. PARTS AND ACCESSORIES AS WELL AS SUB COMPONENTS OF POWER TILLERS (SINGLE AXLE HAND TRACTORS SCHEDULED FOR DELETION.

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NO.	COMPONENTS	SCHEDULES	REMARKS
	ENGINE ASSY GROUP Engine 2 up to 25 Kw.		
1.	Crank case sub assy.	Dec. 31, 1988	
2.	Cylinder liner	Dec. 31, 1987	
3.	Cylinder head	Dec. 31, 1987	
4.	Connecting rod	Dec. 31, 1987	
5.	Crank shaft	Dec. 31, 1987	
6.	Cam shaft	Dec. 31, 1987	
7.	Push rod	Dec. 31, 1987	
8.	Rocker arm	Dec. 31, 1987	
9.	Gear case sub assy	Dec. 31, 1987	
	TRANSMISSION ASSY GROUP		
10.	Case transmission	July 1, 1988	
11.	Staged gear	July 1, 1988	
12.	Forks	July 1, 1987	
13.	Arm	July 1, 1987	
14.	Sprocket	July 1, 1987	

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IV. PARTS AND ACCESSORIES AS WELL AS SUB COMPONENTS OF MINI TRACTORS SCHEDULED FOR DELETION.

NO.	COMPONENTS	SCHEDULES	REMARKS
	ENGINE ASSY GROUP Engine 26 up to 375 Kw.		
1.	Crank case assy	Jan. 1, 1989	
2.	Crank shaft	Jan. 1, 1989	
3.	Cylinder liner	Jan. 1, 1988	
4.	Crank shaft gear	Jan. 1, 1988	
5.	Cam shaft gear	Jan. 1, 1988	
6.	Ring gear	Jan. 1, 1988	
7.	Valve drive	Jan. 1, 1988	
8.	Cylinder head	Jan. 1, 1989	
	TRANSMISSION ASSY GROUP		
9.	Case transmission	Sept. 1, 1988	
10.	Staged shaft	Sept. 1, 1987	
11.	Forks/arm, shifter.	Sept. 1, 1987	
12.	Sprocket	Sept. 1, 1987	
13.	Rotary case	Sept. 1, 1988	

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V. SUB COMPONENTS OF AUTOMOBILE SHOCK ABSORBERS
SCHEDULED FOR DELETION.

No.	COMPONENTS	SCHEDULES	REMARKS
1.	Cylinder tube	July 1, 1987	Except strut type
2.	Damper case	July 1, 1987	
3.	Outer cover	July 1, 1987	
4.	Centering washer	July 1, 1987	
5.	End bolt washer	July 1, 1987	
6.	Piston nut	July 1, 1987	
7.	Protector	July 1, 1987	
8.	Packing cap	July 1, 1987	
9.	Packing retainer	July 1, 1987	
10.	Packing spring	July 1, 1987	
11.	Damper cap	July 1, 1987	
12.	Upper cap	July 1, 1987	
13.	Eye	July 1, 1987	
14.	Ring nut	July 1, 1987	
15.	Spring guide	July 1, 1987	
16.	Spring	July 1, 1987	
17.	Rubber bushing	July 1, 1987	
18.	Rubber bushing collar	July 1, 1987	
19.	Eye washer	July 1, 1987	
20.	Cushion rubber	July 1, 1987	
21.	Spacer	July 1, 1987	
22.	Piston rod	Jan. 1, 1988	
23.	End bolt	Jan. 1, 1988	
24.	Rebound stopper	Jan. 1, 1988	

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VI. SUB COMPONENTS OF AUTOMOBILE AND HEAVY EQUIPMENT RADIATORS. SCHEDULED FOR DELETION.

NO.	COMPONENTS	SCHEDULES	REMARKS
1.	Upper tank assy - Over flow pipe - Filler pipe - Inlet pipe	Jan. 1, 1987 Jan. 1, 1987 Jan. 1, 1987	
2.	Lower tank assy - O-ring/packing rubber plate - Outlet pipe	Jan. 1, 1987 Jan. 1, 1987	
3.	Frame & bracket	Jan. 1, 1987	For heavy equipment.
4.	Pressure cap assy	July 1, 1987	
5.	Upper tank assy: - Upper tank	Jan. 1, 1988	Heavy equipment except fork lift & excavator.

VII. SUB COMPONENTS OF SPARK PLUGS SCHEDULED FOR DELETION.

NO.	COMPONENTS	SCHEDULES	REMARKS
1.	Housing	July 1, 1987 Jan. 1, 1988	Machining Forging.
2.	Insulator : - Terminal stud center electrode - Ceramic	Jan. 1, 1989 Jan. 1, 1989	

- (2) Schedule of the Domestically Manufactured Components Utilization in Assembling Diesel Motor of 2 to 25 kw capacity.

ATTACHMENT: DECREE OF THE MINISTER OF INDUSTRY

NO. 198/M/SK/5/1983 DATED JUNE 9, 1983.

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NO.	G R O U P	YEAR OF UTILIZATION		
		SINCE SEPTEMBER 1, 1983	SINCE SEPTEMBER 1, 1984	SINCE SEPTEMBER 1, 1985
1.	CRANK CASE	1. STUD (O) 2. IDLE FAN (O)	- -	1. CRANK CASE SUB ASSY (1)* 2. CYLINDER LINER (O)
2.	OIL FAN	1. OIL FAN (O) 2. GASKET (O) 3. PLUG, OIL DRAIN (O)	- - -	-
3.	GEAR CASE	1. OIL SEAL (O) 2. GASKET (O)	- -	1. GEAR CASE SUB ASSY (1)*
4.	SIDE COVER	1. GASKET (O) 2. CONNECTOR (O) 3. COVER, BEARING (1)* 4. OIL SEAL (O) 5. RETAINER, BEARING (O) 6. SPRING (O)	- - - - - -	- - - - - -
5.	OIL FILTER	1. CAP, ASSY, OIL FILTER (O)	-	-
6.	BREATHER	1. COVER, AIR BREATHER (O) 2. VALVE, AIR BREATHER (O) 3. BODY, AIR BREATHER (O)	- - -	- - -

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NO.	G R O U P	YEAR OF UTILIZATION			
		SINCE SEPTEMBER 1, 1983	SINCE SEPTEMBER 1, 1984	SINCE SEPTEMBER 1, 1985	
		4. GASKET (0)			
7.	UPPER COVER	1. COVER ASSY, UPPER (0) 2. GASKET (0)	-	-	
8.	ENGINE SUPPORT	. BASE SET. (1)	-	-	
9.	CYLINDER HEAD	1. COCK, WATER DRAIN (0) 2. PIPE, OIL RETURN (0)	-	-	1. CYLINDER HEAD (1)* 2. CHAMBER ASSY, PRESOMBUSTION (1)*
10.	ROCKER COVER	3. GASKET (0) 1. COVER, DECOMPRESS- ION ADJUSTING (0) 2. GASKET (0) 3. SPRING, RETURN (0) 4. COVER, ROCKER (0) 5. SHAFT ASSY, DECO- MPRESSION LEVER (0) 6. ELBOW (0)	-	-	
11.	PISTON	1. CLIP, PISTON PIN (0) 2. PISTON (0) 3. RING, PISTON (0) 4. RING, OIL (0)	-	-	
12.	CONNECTING ROD	1. WASHER, LOCK (0) 2. BEARING, CONNECT- ING ROD (0)	-	-	1. CONNECTING ROD (1)*
13.	CRANK SHAFT	1. PLATE, BEARING STOPPER (0)	1. GEAR, CRANK (1)*	1. CRANK SHAFT (1)*	

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NO.	G R O U P	YEAR OF UTILIZATION		
		SINCE SEPTEMBER 1, 1983	SINCE SEPTEMBER 1, 1984	SINCE SEPTEMBER 1, 1985
		2.SNAP RING (0) 3.KEY, SUNK (0) 4.PULLEY, CRANK SHAFT (0)		
14.	FLY WHEEL	1.FLY WHEEL (0) 2.NUT, LOCK (0) 3.KEY, WOOD RUFF (0)	- - -	- - -
15.	BALANCER	1.DISTANCE PLATE (0) 2.DISTANCE PIECE (0) 3.KEY, SUNK (0) 4.RING SNAP (0) 5.RING (0) 1.KEY, SUNK (0)	1.GEAR, IDLE SHAFT (0) 2.GEAR, BALANCER (0)	1.BALANCER (0)
16.	CAM SHAFT			1.CAM SHAFT (1)*
17.	VALVE DRIVE	1.STAY, ROCKER SHAFT (1)* 2.SHAFT ROCKER (0) 3.LOCK RETAINER (0) 4.VALVE, INLET (0) 5.VALVE, OUTLET (0) 6.RING SNAP (0) 1.SUPPORT, STARTING HANDLE (0) 2.CLAMP STARTING HANDLE (0)	1.CAM, INJECTION PUMP (0) 2.GEAR, CAM SHAFT (0) 3.GEAR, STARTING (0) 1.SPRING, VALVE (0) 2.RETAINER VALVE SPRING (0)	1.ROCKER ARM (1)* 2.TAPPET (0)
18.	STARTING HANDLE		1.GEAR STARTING SHAFT (0)	-

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NO.	G R O U P	YEAR OF UTILIZATION		
		SINCE SEPTEMBER 1, 1983	SINCE SEPTEMBER 1, 1984	SINCE SEPTEMBER 1, 1985
		3. SHAFT ASSY, STARTING (O)		
		4. KEY, SUNK (O)		
		5. RING, SNAP (O)		
19.	MISCELLANEOUS TIMING	1. INDICATOR TIMING (O)		
20.	FUEL INJECTION PUMP	-		1. SHIM, ADJUSTING (O) 2. LEVER ASSY, PRIMING (O)
21.	N O Z Z L E	1. GASKET (O)		
22.	INJECTION PIPE	1. PIPE, FUEL INJECTION (O)		
23.	FUEL TANK	1. TANK ASSY, FUEL (O)		
24.	FUEL FILTER	1. FILTER ASSY, FUEL (O) 2. SUPPORT, FILTER (O)		
25.	FUEL PIPE	1. PIPE, RUBBER (O) 2. PIPE, FUEL (O)	1. CONNECTOR (O)	
26.	MECHANICAL GOVERNOR	1. METAL, SAILING 2. WIRE (O)	1. SHAFT, GOVERNOR (O) 2. LEVER ASSY, SPEED GOVERNOR (O)	
		3. WEIGHT ASSY, GOVERNOR (O)		
		4. LEVER, GOVERNOR (O)		
		5. SHAFT ASSY, GOVERNOR (O)		

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NO.	G R O U P	YEAR OF UTILIZATION.		
		SINCE SEPTEMBER 1, 1983	SINCE SEPTEMBER 1, 1984	SINCE SEPTEMBER 1, 1985
		6. COVER ASSY, GOVERNOR (O)	-	-
		7. SPRING, GOVERNOR (O)		
		8. KNOB, SPEED CONTROL (O)		
		9. INDICATOR (O)	-	-
		10. SPRING (O)		
		11. SHAFT, SPEED CONTROL (O)		
		12. DISTANCE PIECE ASSY (O)		
		13. CLIP, CABLE (O)	-	-
		14. LABEL (O)		
		15. PACKING (O)		
		16. RING, SNAP (O)		
27.	OIL PUMP	1. OIL RING (O)	1. COVER, ROTOR (O)	1. ROTOR ASSY (O)
28.	OIL SCREEN	1. OIL SCREEN (O)	-	-
29.	OIL PIPE	1. OIL PIPE ASSY (FOR ROCKER COVER) (O)	-	-
		2. OIL PIPE (FOR OIL SIGNAL) (O)		
		3. GASKET (O)		
30.	OIL PRESSURE GAGE UNIT			1. SIGNAL, OIL PRESSURE (O)

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NO.	G E O U P	YEAR OF UTILIZATION		
		SINCE SEPTEMBER 1, 1983	SINCE SEPTEMBER 1, 1984	SINCE SEPTEMBER 1, 1985
31.	HOPPER/ RADIATOR/ CONDENSOR	1. SIGNAL, WATER LEVEL GAGE (O) 2. SCREEN ASSY, HOPPER (O) 3. HOPPER (O) 4. GASKET (O) 5. PROTECTOR ASSY OVER FLOW (O) 6. BELT, HOPPER (O) 7. HANGER 1. AIR CLEANER ASSY (O)	1. CONDENSOR (O)	-
32.	AIR CLEANER			-
33.	INTAKE PIPE	1. INTAKE PIPE (O) 2. GASKET	-	-
34.	MUFFLER	1. MUFFLER ASSY (O) 2. GASKET	-	-
35.	MISCELLAN- EOUS	1. P I N (O) 2. B C L T (O) 3. SCREW (O) 4. WASHER (O) 5. TOOL SET (O)	-	-

NOTE : (O) = OUT HOUSE MANUFACTURING

(1) = IN HOUSE MANUFACTURING

" " = only machining work, "Blank" of foundry/forging for the above mentioned

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components is still importable as long as said "Blank" have not been domestically manufactured.

THE MINISTRY OF INDUSTRY

signed

Ir. HARTARTO

- - - - -

- (3) Utilization Schedule of Domestically Manufactured Components in Assembling Diesel Motor of 26 through 375 kw capacity.

ATTACHMENT : DECREE OF THE MINISTER OF INDUSTRY
NO. 202/M/SK/6/1983 DATED JUNE 9, 1983.

1/4

NO.	G R O U P	YEAR OF UTILIZATION			
		SINCE OCTOBER 1, 1983	SINCE OCTOBER 1, 1984	SINCE OCTOBER 1, 1985	SINCE OCTOBER 1, 1986
(1)	(2)	(3)	(4)	(5)	(6)
1.	CRANK CASE		1. OIL PAN (0) 2. DIP ROD (0) 3. OIL FILTER PLUG (0)	1. CYLINDER LINER (1) 2. COUNTER BALANCE (1) 3. FRONT COVER (1) 4. FLY WHEEL HOUSING (1)	1. CRANK CASE ASSY (1)
2.	CRANK SHAFT		1. FLY WHEEL (1)	1. COUNTER WEIGHT (1)	1. CRANK SHAFT (1)
3.	CAM SHAFT			1. CAM SHAFT ASSY (1)	
4.	GEAR GROUP				1. CRANK SHAFT GEAR (1) 2. CAM SHAFT GEAR (1) 3. RING GEAR (1)
5.	COVER GROUP			1. COVER (1)	
6.	PISTON ASSY		1. PISTON RING (0) 2. PISTON (0)		

(1)	(2)	(3)	(4)	(5)	(6)
7.	CONNECTING ROD		3. PISTON PIN (1) 1. CONNECTING ROD (1)		
8.	CYLINDER HEAD		1. SUPPORT OF ROCKER ARM (1) 2. ROCKER ARM 3. PUSH ROD (1)	1. CYLINDER HEAD (1) 2. CYLINDER HEAD COVER (1)	
9.	OIL GEAR PUMP	1. OIL GEAR PUMP COMPLETE (O)			1. 1987.
10.	OIL COOLER	1. OIL COOLER COMPLETE (O)			1. 1987.
11.	FILTER GROUP	1. OIL FILTER(O) 2. FUEL FILTER (O) 3. AIR FILTER(O) 4. BRACKET (O)			
12.	CENTRIFUGAL				1. CENTRIFUGAL PUMP ASSY (O)
13.	FAN DRIVE				1. FAN DRIVE ASSY (O)
14.	BLOWER				1. BLOWER ASSY (O)
15.	INDIRECT COOLING			1. INDIRECT COOLING ASSY (O)	
16.	COOLING SYSTEM			1. CIRCULATION COOLING ASSY (O) 2. AIRDUCTION ASSY(O)	

(1)	(2)	(3)	(4)	(5)	(6)
17.	INTAKE & EXHAUST PIPE		1. INTAKE & EXHAUST PIPE (1)		
18.	DYNAMO / ALTERNATOR			1. DYNAMO/ALTERNATOR ASSY (0) 2. SUPPORT ASSY (1)	
19.	STARTER			1. ELECTRIC STARTER (0)	
20.	ELECTRIC EQUIPMENT/PANEL ENGINE		1. ELECTRIC EQUIPMENT/ENGINE PANEL ASSY (0)		
21.	ENGINE MOUNTING	1. ENGINE MOUNTING ASSY (0)			
22.	PULLY GROUP		1. CRANK SHAFT PULLY (1) 2. CENTRIFUGAL PUMP PULLY (1) 3. TENSION PULLY (1) 4. FAN DRIVE PULLY (1) 5. ALTERNATOR PULLY (1)		
23.	PIPING GROUP	1. COOLING WATER PIPE (0) 2. FUEL PRESSURE PIPE (1)			

(1)	(2)	(3)	(4)	(5)	(6)
		3. LUBRICATION PIPE (1) 4. EXHAUST PIPE CONNECTION (0) 5. PROTECTIVE PIPE (1)			
24.	COMPONENTS STANDARD	1. CLAMP (0) 2. V-BELT (0)	1. GASKET (0)		
25.	MISCELLANEOUS	1. ACCU (0) 2. MUFFLER (0) 3. HANDLING SLUG	1. TOOLS (0) 2. TURNING DEVICE (0) 3. PLASTIC PARTS (0)		

NOTE :

1. In house work (1) is only machining, whereas Blanks is from outside.
2. Blanks from foundry/forging for the foregoing components can still be imported as long as said blanks have not been able domestically manufactured.
3. The excheded components which can still be imported are : Spec 1 Screw & Nut; Stud; Valve; Roller/Ball Bearing; Bushing/Bearing Bush; Speed Adjusting Control Device; Injection Pump Assy and Turbo Charger ; etc.
4. By not closing the possibility for the manufacturing companies to manufacture said components earliner than the stipulated schedule.
5. (1) = in house work.
(0) = out house work.

MINISTER OF INDUSTRY
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Ir. HARTARTO.

(4) Schedules for Machine Tool Production

ATTACHMENT I TO THE DECREE OF THE MINISTER OF INDUSTRY
NO. 28/N/SX/1/1985 DATED JANUARY 21, 1985

1/6

NO.	KINDS OF MACHINE TOOLS	GROUPS OF COMPONENTS	DATES FOR MACHINE TOOL PRODUCTION					
			JULY 1 1985		JULY 1, 1986		DECEMBER 31, 1987	
			IMPORTS	LOCAL	IMPORTS	LOCAL	IMPORTS	LOCAL
1	2	3	4	5	6	7	8	9
1.	LATHES - Center distance less than 1600 mm. - Center height maximum 180 mm	1. Chuck assy.	-Chuck assy		-Chuck assy		-Chuck assy	
		2. Transmission	-Speed gears -Shafts -Reverser gears		-Speed gears -Shafts -Reverser gears			-Speed gears -Shafts -Reverser gears.
		3. Apron assy.	-Case -Saddle -Cross slide -Lead screw -Bed -Racks -Feed rod -Rear support		-Case -Saddle -Cross slide -Lead screw -Bed -Racks -Feed rod -Rear support			-Case -Saddle -Cross slide -Lead screw -Bed -Racks -Feed rod -Rear support
		4. Reversers rod & Driver						

1	2	3	4	5	6	7	8	9
		5. Leg & covers		- Cabinet leg - Rear leg - Front leg - Chip pan - Sheet cover - Aluminium cover		- Cabinet leg - Rear leg - Front leg - Chip pan - Sheet cover - Aluminium cover		- Cabinet leg - Rear leg - Front leg - Chip pan - Sheet cover - Aluminium cover
		6. Head stock assy	- Case - Gear - Main spindle		- Case - Gear - Main spindle		- Main spindle	- Case - Gear
		7. Swivel ling Tool slide assy	- Tool post slide - tool holder			- Tool holder - Tool post slide		- Tool holder - Tool post slide
		8. Tail Stock assy	- Case - Shaft - Racks gear		- Case - Shaft - Racks gear			- Case - Shaft - Racks gear

1	2	3	4	5	6	7	8	9
		9. Others	-Cooling system -Coolant pump -Coolant pump -Brake system -Copying attachment -Electro motor -Lever -Bearing -Bolt & Nut	-Coolant tank	-Cooling system -Coolant pump -Brake system -Copying attachment -Bearing -Bolt & Nut -Screw -Spring -Electric/electronic components	-Electro motor -Lever -Brake system -Copying attachment -Bearing -Bolt & Nut -Screw -Electric/electronic components	-Coolant pump -Brake system -Copying attachment -Bearing -Bolt & Nut -Screw -Electric/electronic components	-Electro motor -Lever -Brake system -Copying attachment -Bearing -Bolt & Nut -Screw -Electric/electronic components
2.	KNEE TYPE FREIS MACHINES. Table size: 1200 x 250 mm	1. Column assy	-Column -Case -Screw shaft	-Base -Cover		-Case -Cover -Base -Screw shaft -Column		-Case -Cover -Base -Screw shaft -Column
		2. Main spindle	-Gear assy -Spindle -supporting arm		-Spindle -Gear assy	-Supporting arm	-Spindle	-Gear assy -Supporting arm
		3. Main drive	-Gears -Electro motor	-Pulley	-Gear assy	-Electro motor pulley		-Gear assy -Electro motor assy -Pulley

4/6

1	2	3	4	5	6	7	8	9
		4. Feed Drive	-Extend-able shaft -Worm gear -Gears	-Case	-Gears -Worm gear assy	-Case -Extendable shaft		-Gears assy -Case -Extendable shaft. -Worm gear assy.
		5. Knee	-Guide slide	-Frame		-Frame -Guide		-Frame -Guide slide
		6. Cross	-Saddle -Guide slide			-Saddle -Guide slide		-Saddle -Guide slide
		7. Table		-Table -Chip tray -Coolant tank		-Table -Chip tray -Coolant tank		-Table -Chip tray -Coolant tank.
		8. Others	-Cooling system -Hydraulic components -Electric/ electronic components -Coolant pump assy	-Panel box	-Cooling system -Hydraulic components -Electric/ electronic components -Bearing -Coolant. pump assy	-Panel box	-Coolant pump	-Panel box -Hydraulic components -Cooling system -Electric/ electronic components -Bearing.

1	2	3	4	5	6	7	8	9
3.	SURFACE GRINDING MACHINES. -Table type -Table size: 220 x 500 mm		-Cooling system -Hydraulic components -Spindle -Column -Base -Gears -Electro motor -Electric/electronic components -Coolant pump assy -Bearing	-Table & leg -Sliding head -Coolant tank -Panel box	-Cooling system -Hydraulic components -Gears -Spindle -Electric/electronic components -Coolant pump assy -Bearing	-Table & leg -Sliding head -Coolant tank -Panel box -Electro motor -Column -Base	-Spindle -Coolant pump assy	-Table & leg -Sliding head -Coolant tank -Panel box -Gears -Electro motor -Column -Base -Hydraulic components -Cooling system -Electric/electronic components -Bearing
4.	COLUMN TYPE BORING MACHINE		-Base -Table -column -drill head -spindle -gears -Electro motor -electric/electronic components -bearing -coolant pump assy	-Handle -hand wheel -lever -bush -pin -cover -pulley	-Gears -drill head -spindle -Electric/electronic components -bearing -coolant pump assy	-handle -hand wheel -lever -bush -pin -cover -pulley -Base -table -Column -electro motor	-spindle -coolant pump assy	-handle -hand wheel -lever -bush -pin -cover -pulley -gears -base -table -column -electro motor -drill head -bearing -electric/electronic components

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ATTACHMENT II TO THE DECREE OF THE MINISTER OF INDUSTRY
NO.28/H/SK/1/1985 DATED JANUARY 21, 1985

COMPONENTS THAT CAN BE IMPORTED FOR THE FOLLOWING MACHINE TOOLS:

Sewing machines, table type boring machines, plate folding machines, pipe bending machines, forging machines, shearing machines, rolling machines, punching machines, drill combination Frels machines, press brake machines.

1. Sawing machines : Size of objects : 180 mm.
Electric components can be imported as long as they are not yet locally made.
2. Table type boring machines: Diameter of bits : 13 mm.
Complete hydraulic components : cooling pumps, electric components and bearings can be imported as long as they are not yet locally made.
3. Plate folding machines :
For plate folding machines, width of plates 2,500 mm and thickness 21 mm.
For plate folding machines : hydraulic and electric components can be imported as long as they are not yet locally made.
4. Pipe bending machines :
For pipe bending machines, diameter of pipes 25 mm.
Pipe bending machine components: hydraulic and electric components can be imported as long as they are not yet locally made.
5. Forging machines : Work pressure 250 tons.
Complete hydraulic components and electric components can be imported as long as they are not yet locally made.
6. Shearing machines : Width of plates 1,200 mm, thickness 2 mm.
Complete hydraulic components and bearings can be imported as long as they are not yet locally made.
7. Rolling machines : Length of plates 2,500 mm, thickness 21 mm.
Electric components and bearings can be imported as long as they are not yet locally made.
8. Punching machines: Pressure 3 tons and thickness of plates 3 mm.
Electric components can be imported as long as they are not yet locally made.
9. Drill combination Frels machines : table size 240 x 600 mm.
Bits 32 mm.
Electric components, spindles and bearings can be imported as long as they are not yet locally made.
10. Press brake machines :
Electric and hydraulic components can be imported as long as they are not yet locally made.

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H A R T A R T O . -

ANNEX W.

APPENDIX TABLE

ANNEX IV - Appendix Tables

(1)	<u>Frequency of Testing & Inspections by Industry</u>	
	1) Machine Tool	ANX IV-8-1
	2) Agriculture Machine	" IV-8-2
	3) Construction Machine	" IV-8-3
	4) Electric Machine & Appliances	" IV-8-4
	5) Automobile	" IV-8-5
	6) Motorcycle	" IV-8-6
	7) Diesel Engine	" IV-8-7
	8) Ship Building	" IV-8-8
	9) Process Equipment	" IV-8-9
(2)	<u>Recommendable Number of Testing and Inspection</u>	ANX IV-8-10
(3)	<u>Distribution of Industry by Region</u>	
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	3) Construction Machine	" IV-8-22
	4) Electric Machine and Appliance	" IV-8-23
	5) Automobile	" IV-8-24
	6) Motorcycle	" IV-8-25
	7) Diesel Engine	" IV-8-26
	8) Ship Building	" IV-8-27
	9) Process Equipment	" IV-8-28
(4)	<u>Flow of Recommendable Testing and Inspections by Industry and Region</u>	
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	2) Agriculture Machine	" IV-8-30
	3) Construction Machine	" IV-8-31
	4) Electrical Machine	" IV-8-32
	5) Electrical Appliances	" IV-8-33
	6) Automotive	" IV-8-34
	7) Motorcycle	" IV-8-35
	8) Diesel Engine	" IV-8-36
	9) Ship Building	" IV-8-37
	10) Process Equipment	" IV-8-38

- (5) Flow of Testing and Inspections by Regions
- 1) Flow of Testing and Inspections in JABOTABEK ANX IV-8-39
 - 2) Flow of Testing and Inspections in JAWA BARAT (Excluding JABOTABEK) " IV-8-40
 - 3) Flow of Testing and Inspections in JAWA TENGAH " IV-8-41
 - 4) Flow of Tests and Inspections in JAWA TIMUR " IV-8-42
 - 5) Flow of Testing and Inspections in SUMATERA " IV-8-43
 - 6) Flow of Testing and Inspections in Other Regions " IV-8-44
- (6) Services of B4T by Region, 1987 ANX IV-8-45
- (7) Adjusted Flow of Testing and Inspection by Regions
- 1) Adjusted Flow of Testing and Inspections in JABOTABEK ANX IV-8-46
 - 2) Adjusted Flow of Testing and Inspections in JAWA BARAT " IV-8-47
 - 3) Adjusted Flow of Testing and Inspections in JAWA TENGAH " IV-8-48
 - 4) Adjusted Flow of Testing and Inspections in JAWA TIMUR " IV-8-49
 - 5) Adjusted Flow of Testing and Inspections in SUMATERA " IV-8-50
 - 6) Adjusted Flow of Testing and Inspections in Other Regions " IV-8-51
- (8) Services of MIDC by Region, 1984 - 1986 ANX IV-8-52

FREQUENCY OF TESTS & INSPECTIONS BY INDUSTRY

INDUSTRY: MACHINE TOOL

TESTS & INSPECTIONS	CASTING	FORGING, HEAT TREATMENT	MACHINING	SHEET WORK, WELDING	PRESS WORK	PLATING
<CATEGORY A>						
1)BRINNEL HARDNESS	0.05 /TON	0.2 /TON				
2)VICKERS HARDNESS	0.025 /TON	0.1 /TON				0.05 /UNIT
3)TENSILE	0.5 /TON	2 /TON				
4)IMPACT	0.15 /TON	0.6 /TON				
5)PROJECTOR	0.15 /TON	0.6 /TON				
6)MICRO STRUCTURE		2 /TON				1 /UNIT
7)CHEMICAL ANALYSIS	0.5 /TON	2 /TON				
<CATEGORY B>						
8)SURFACE ROUGHNESS			1 /UNIT			
9)3-DIM. MEASUREMENT			1 /UNIT			
10)GEAR TOOTH DIM.			1 /UNIT			
<CATEGORY C1>						
11)MAGNETIC PARTICLE				0.1 /TON		
<CATEGORY C2>						
12)ULTRASONIC						
13)X-RAY						

FREQUENCY OF TESTS & INSPECTIONS BY INDUSTRY

INDUSTRY: AGRICULTURE MACHINE

TESTS & INSPECTIONS	CASTING	FORGING, HEAT TREATMENT	MACHINING	SHEET WORK, WELDING	PRESS WORK	PLATING
<CATEGORY A>						
1)BRINNEL HARDNESS	0.05 /TON	0.2 /TON				
2)VICKERS HARDNESS	0.025 /TON	0.1 /TON				
3)TENSILE	0.5 /TON	2 /TON				
4)IMPACT	0.15 /TON	0.6 /TON				
5)PROJECTOR	0.15 /TON	0.6 /TON				
6)MICRO STRUCTURE		2 /TON				
7)CHEMICAL ANALYSIS	0.5 /TON	2 /TON				
<CATEGORY B>						
8)SURFACE ROUGHNESS			0.025 /UNIT			
9)3-DIM. MEASUREMENT						
10)GEAR TOOTH DIM.			0.025 /UNIT			
<CATEGORY C1>						
11)MAGNETIC PARTICLE				0.1 /TON		
<CATEGORY C2>						
12)ULTRASONIC						
13)X-RAY						

FREQUENCY OF TESTS & INSPECTIONS BY INDUSTRY

INDUSTRY: CONSTRUCTION MACHINE

TESTS & INSPECTIONS	CASTING	FORGING, HEAT TREATMENT	MACHINING	SHEET WORK, WELDING	PRESS WORK	PLATING
<CATEGORY A>						
1)BRINNEL HARDNESS	0.05 /TON	0.2 /TON				
2)VICKERS HARDNESS	0.025 /TON	0.1 /TON				0.05 /UNIT
3)TENSILE	0.5 /TON	2 /TON				
4)IMPACT	0.15 /TON	0.6 /TON				
5)PROJECTOR	0.15 /TON	0.6 /TON				
6)MICRO STRUCTURE		2 /TON				1 /UNIT
7)CHEMICAL ANALYSIS	0.5 /TON	2 /TON				
<CATEGORY B>						
8)SURFACE ROUGHNESS			1 /UNIT			
9)3-DIM. MEASUREMENT						
10)GEAR TOOTH DIM.			1 /UNIT			
<CATEGORY C1>						
11)MAGNETIC PARTICLE				0.1 /TON		
<CATEGORY C2>						
12)ULTRASONIC						
13)X-RAY						

FREQUENCY OF TESTS & INSPECTIONS BY INDUSTRY

INDUSTRY: ELECTRIC MACHINE & APPLIANCES

TESTS & INSPECTIONS	CASTING	FORGING, HEAT TREATMENT	MACHINING	SHEET WORK, WELDING	PRESS WORK	PLATING
<CATEGORY A>						
1)BRINNEL HARDNESS		0.2 /TON				
2)VICKERS HARDNESS		0.1 /TON				
3)TENSILE		2 /TON				
4)IMPACT		0.6 /TON				
5)PROJECTOR		0.6 /TON				
6)MICRO STRUCTURE		2 /TON				
7)CHEMICAL ANALYSIS		2 /TON				
<CATEGORY B>						
8)SURFACE ROUGHNESS						
9)3-DIM. MEASUREMENT						
10)GEAR TOOTH DIM.						
<CATEGORY C1>						
11)MAGNETIC PARTICLE						
<CATEGORY C2>						
12)ULTRASONIC						
13)X-RAY						

FREQUENCY OF TESTS & INSPECTIONS BY INDUSTRY

INDUSTRY: AUTOMOBILE

TESTS & INSPECTIONS	CASTING	FORGING, HEAT TREATMENT	MACHINING	SHEET WORK, WELDING	PRESS WORK	PLATING
<CATEGORY A>						
1)BRINNEL HARDNESS	0.05 /TON	0.2 /TON				
2)VICKERS HARDNESS	0.025 /TON	0.1 /TON				0.0005 /UNIT
3)TENSILE	0.5 /TON	2 /TON				
4)IMPACT	0.15 /TON	0.6 /TON				
5)PROJECTOR	0.15 /TON	0.6 /TON				
6)MICRO STRUCTURE		2 /TON				0.01 /UNIT
7)CHEMICAL ANALYSIS	0.5 /TON	2 /TON				
<CATEGORY B>						
8)SURFACE ROUGHNESS			0.01 /UNIT			
9)3-DIM. MEASUREMENT			0.01 /UNIT			
10)GEAR TOOTH DIM.			0.01 /UNIT			
<CATEGORY C1>						
11)MAGNETIC PARTICLE						
<CATEGORY C2>						
12)ULTRASONIC						
13)X-RAY						

FREQUENCY OF TESTS & INSPECTIONS BY INDUSTRY

INDUSTRY: MOTORCYCLE

TESTS & INSPECTIONS	CASTING	FORGING, HEAT TREATMENT	MACHINING	SHEET WORK, WELDING	PRESS WORK	PLATING
<CATEGORY A>						
1)BRINNEL HARDNESS	0.05 /TON	0.2 /TON				
2)VICKERS HARDNESS	0.025 /TON	0.1 /TON				0.00025/UNIT
3)TENSILE	0.5 /TON	2 /TON				
4)IMPACT	0.15 /TON	0.6 /TON				
5)PROJECTOR	0.15 /TON	0.6 /TON				
6)MICRO STRUCTURE		2 /TON				0.005 /UNIT
7)CHEMICAL ANALYSIS	0.5 /TON	2 /TON				
<CATEGORY B>						
8)SURFACE ROUGHNESS			0.005 /UNIT			
9)3-DIM. MEASUREMENT			0.005 /UNIT			
10)GEAR TOOTH DIM.			0.005 /UNIT			
<CATEGORY C1>						
11)MAGNETIC PARTICLE						
<CATEGORY C2>						
12)ULTRASONIC						
13)X-RAY						

FREQUENCY OF TESTS & INSPECTIONS BY INDUSTRY

INDUSTRY: DIESEL ENGINE

TESTS & INSPECTIONS	CASTING	FORGING, HEAT TREATMENT	MACHINING	SHEET WORK, WELDING	PRESS WORK	PLATING
<CATEGORY A>						
1)BRINNEL HARDNESS	0.05 /TON	0.2 /TON				
2)VICKERS HARDNESS	0.025 /TON	0.1 /TON				0.0005 /UNIT
3)TENSILE	0.5 /TON	2 /TON				
4)IMPACT	0.15 /TON	0.6 /TON				
5)PROJECTOR	0.15 /TON	0.6 /TON				
6)MICRO STRUCTURE		2 /TON				0.01 /UNIT
7)CHEMICAL ANALYSIS	0.5 /TON	2 /TON				
<CATEGORY B>						
8)SURFACE ROUGHNESS			0.01 /UNIT			
9)3-DIM. MEASUREMENT			0.01 /UNIT			
10)GEAR TOOTH DIM.			0.01 /UNIT			
<CATEGORY C1>						
11)MAGNETIC PARTICLE				0.1 /TON		
<CATEGORY C2>						
12)ULTRASONIC						
13)X-RAY						

FREQUENCY OF TESTS & INSPECTIONS BY INDUSTRY

INDUSTRY: SHIP BUILDING

TESTS & INSPECTIONS	HULL STEEL	EQUIPMENT & OUTFIT
<CATEGORY A>		
1)BRINNEL HARDNESS	0.01 /TON	0.01 /TON
2)VICKERS HARDNESS	0.005 /TON	0.005 /TON
3)TENSILE	0.1 /TON	0.1 /TON
4)IMPACT	0.03 /TON	0.03 /TON
5)PROJECTOR	0.03 /TON	0.03 /TON
6)MICRO STRUCTURE		
7)CHEMICAL ANALYSIS	0.1 /TON	0.1 /TON
<CATEGORY B>		
8)SURFACE ROUGHNESS		
9)3-DIM. MEASUREMENT		
10)GEAR TOOTH DIM.		
<CATEGORY C1>		
11)MAGNETIC PARTICLE	0.01 /TON	0.01 /TON
<CATEGORY C2>		
12)ULTRASONIC		
13)X-RAY	0.1 /TON	0.1 /TON

FREQUENCY OF TESTS & INSPECTIONS BY INDUSTRY

INDUSTRY: PROCESS EQUIPMENT

TESTS & INSPECTIONS	STRUCTURE WORK	PLATE WORK	MACHINE WORK
<CATEGORY A>			
1)BRINNEL HARDNESS	0.01 /TON		
2)VICKERS HARDNESS	0.005 /TON		
3)TENSILE	0.1 /TON		
4)IMPACT	0.03 /TON		
5)PROJECTOR	0.03 /TON		
6)MICRO STRUCTURE			
7)CHEMICAL ANALYSIS	0.1 /TON		
<CATEGORY B>			
8)SURFACE ROUGHNESS			1 /TON
9)3-DIM. MEASUREMENT			
10)GEAR TOOTH DIM.			1 /TON
<CATEGORY C1>			
11)MAGNETIC PARTICLE	0.01 /TON	0.01 /TON	
<CATEGORY C2>			
12)ULTRASONIC	0.05 /TON	0.05 /TON	
13)X-RAY	0.05 /TON	0.05 /TON	

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	MACHINE TOOL		
	1985	1993	1998
NUMBER OF UNIT	1,208	10,000	21,667

TESTS & INSPECTIONS	YEAR	1985	1993	1998
<CATEGORY A>				
1)BRINNEL HARDNESS		4	211	968
2)VICKERS HARDNESS		2	156	1,405
3)TENSILE		43	2,111	9,682
4)IMPACT		13	633	2,904
5)PROJECTOR		13	633	2,904
6)MICRO STRUCTURE		0	1,420	20,461
7)CHEMICAL ANALYSIS		43	2,111	9,682
<CATEGORY B>				
8)SURFACE ROUGHNESS		181	2,500	8,667
9)3-DIM. MEASUREMENT		181	2,500	8,667
10)GEAR TOOTH DIM.		181	2,500	8,667
<CATEGORY C1>				
11)MAGNETIC PARTICLE		3	59	206
<CATEGORY C2>				
12)ULTRASONIC		0	0	0
13)X-RAY		0	0	0
SUB TOTAL		664	14,834	74,213

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	AGRICULTURE MACHINE		
YEAR	1985	1993	1998
NUMBER OF UNIT	11,892	33,343	85,110

TESTS & INSPECTIONS	YEAR	1985	1993	1998
<CATEGORY A>				
1)BRINNEL HARDNESS		54	257	837
2)VICKERS HARDNESS		28	129	419
3)TENSILE		542	2,575	8,377
4)IMPACT		162	772	2,513
5)PROJECTOR		162	772	2,513
6)MICRO STRUCTURE		90	794	3,412
7)CHEMICAL ANALYSIS		542	2,675	8,377
<CATEGORY B>				
8)SURFACE ROUGHNESS		89	417	1,489
9)3-DIM. MEASUREMENT		0	0	0
10)GEAR TOOTH DIM.		89	417	1,489
<CATEGORY C1>				
11)MAGNETIC PARTICLE		66	350	1,257
<CATEGORY C2>				
12)ULTRASONIC		0	0	0
13)X-RAY		0	0	0
SUB TOTAL		1,824	9,058	30,683

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	CONSTRUCTION MACHINE		
	1985	1993	1998
NUMBER OF UNIT	1,914	2,442	3,116

TESTS & INSPECTIONS	YEAR	1985	1993	1998
<CATEGORY A>				
1)BRINNEL HARDNESS		17	488	1,312
2)VICKERS HARDNESS		9	256	788
3)TENSILE		170	4,881	13,122
4)IMPACT		51	1,464	3,936
5)PROJECTOR		51	1,464	3,936
6)MICRO STRUCTURE		118	3,634	11,767
7)CHEMICAL ANALYSIS		170	4,881	13,122
<CATEGORY B>				
8)SURFACE ROUGHNESS		574	1,221	2,181
9)3-DIM. MEASUREMENT		0	0	0
10)GEAR TOOTH DIM.		574	1,221	2,181
<CATEGORY C1>				
11)MAGNETIC PARTICLE		86	1,460	3,254
<CATEGORY C2>				
12)ULTRASONIC		0	0	0
13)X-RAY		0	0	0
SUB TOTAL		1,820	20,970	55,599

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	ELECTRIC MACHINE		
	1985	1993	1998
NUMBER OF UNIT	2,444K	3,838K	6,062K

TESTS & INSPECTIONS	YEAR	1985	1993	1998
<CATEGORY A>				
1)BRINNEL HARDNESS		0	0	0
2)VICKERS HARDNESS		0	0	0
3)TENSILE		0	0	0
4)IMPACT		0	0	0
5)PROJECTOR		0	0	0
6)MICRO STRUCTURE		0	0	0
7)CHEMICAL ANALYSIS		0	0	0
<CATEGORY B>				
8)SURFACE ROUGHNESS		0	0	0
9)3-DIM. MEASUREMENT		0	0	0
10)GEAR TOOTH DIM.		0	0	0
<CATEGORY C1>				
11)MAGNETIC PARTICLE		0	0	0
<CATEGORY C2>				
12)ULTRASONIC		0	0	0
13)X-RAY		0	0	0
SUB TOTAL		0	0	0

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	ELECTRIC APPLIANCES		
	1985	1993	1998
NUMBER OF UNIT	8,380K	10,700K	13,626K

TESTS & INSPECTIONS	YEAR	1985	1993	1998
<CATEGORY A>				
1)BRINNEL HARDNESS		0	65	83
2)VICKERS HARDNESS		0	33	41
3)TENSILE		0	650	828
4)IMPACT		0	195	248
5)PROJECTOR		0	195	248
6)MICRO STRUCTURE		0	650	828
7)CHEMICAL ANALYSIS		0	650	828
<CATEGORY B>				
8)SURFACE ROUGHNESS		0	0	0
9)3-DIM. MEASUREMENT		0	0	0
10)GEAR TOOTH DIM.		0	0	0
<CATEGORY C1>				
11)MAGNETIC PARTICLE		0	0	0
<CATEGORY C2>				
12)ULTRASONIC		0	0	0
13)X-RAY		0	0	0
SUB TOTAL		0	2,438	3,104

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	AUTOMOTIVE		
	1985	1993	1998
NUMBER OF UNIT	130K	183K	295K

TESTS & INSPECTIONS	1985	1993	1998
<CATEGORY A>			
1)BRINNEL HARDNESS	0	3,397	6,948
2)VICKERS HARDNESS	0	1,708	3,599
3)TENSILE	0	33,972	69,483
4)IMPACT	0	10,192	20,845
5)PROJECTOR	0	10,192	20,845
6)MICRO STRUCTURE	0	30,735	63,082
7)CHEMICAL ANALYSIS	0	33,972	69,483
<CATEGORY B>			
8)SURFACE ROUGHNESS	0	549	885
9)3-DIM. MEASUREMENT	0	549	885
10)GEAR TOOTH DIM.	0	549	885
<CATEGORY C1>			
11)MAGNETIC PARTICLE	0	0	0
<CATEGORY C2>			
12)ULTRASONIC	0	0	0
13)X-RAY	0	0	0
SUB TOTAL	0	125,815	256,920

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	MOTORCYCLE		
	YEAR	1985	1993
NUMBER OF UNIT	248K	503K	810K

TESTS & INSPECTIONS	YEAR	1985	1993	1998
<CATEGORY A>				
1)BRINNEL HARDNESS		0	1,583	3,145
2)VICKERS HARDNESS		0	804	1,745
3)TENSILE		0	15,823	31,452
4)IMPACT		0	4,747	9,435
5)PROJECTOR		0	4,747	9,435
6)MICRO STRUCTURE		0	14,750	32,637
7)CHEMICAL ANALYSIS		0	15,823	31,452
<CATEGORY B>				
8)SURFACE ROUGHNESS		124	755	1,215
9)3-DIM. MEASUREMENT		124	755	1,215
10)GEAR TOOTH DIM.		124	755	1,215
<CATEGORY C1>				
11)MAGNETIC PARTICLE		0	0	0
<CATEGORY C2>				
12)ULTRASONIC		0	0	0
13)X-RAY		0	0	0
SUB TOTAL		372	60,542	122,946

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	DIESEL ENGINE		
YEAR	1985	1993	1998
NUMBER OF UNIT	96K	150.72K	238.08K

TESTS & INSPECTIONS	YEAR	1985	1993	1998
<CATEGORY A>				
1)BRINNEL HARDNESS		0	119	619
2)VICKERS HARDNESS		0	68	411
3)TENSILE		0	1,191	6,190
4)IMPACT		0	358	1,857
5)PROJECTOR		0	358	1,857
6)MICRO STRUCTURE		0	603	4,881
7)CHEMICAL ANALYSIS		0	1,191	6,190
<CATEGORY B>				
8)SURFACE ROUGHNESS		96	452	1,190
9)3-DIM. MEASUREMENT		96	452	1,190
10)GEAR TOOTH DIM.		96	452	1,190
<CATEGORY C1>				
11)MAGNETIC PARTICLE		38	72	113
<CATEGORY C2>				
12)ULTRASONIC		0	0	0
13)X-RAY		0	0	0
SUB TOTAL		326	5,316	25,688

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	SHIP BUILDING		
YEAR	1985	1993	1998
NUMBER OF UNIT			

TESTS & INSPECTIONS	YEAR	1985	1993	1998
<CATEGORY A>				
1)BRINNEL HARDNESS		0	30	60
2)VICKERS HARDNESS		0	15	30
3)TENSILE		0	300	600
4)IMPACT		0	90	180
5)PROJECTOR		0	90	180
6)MICRO STRUCTURE		0	0	0
7)CHEMICAL ANALYSIS		0	300	600
<CATEGORY B>				
8)SURFACE ROUGHNESS		0	0	0
9)3-DIM. MEASUREMENT		0	0	0
10)GEAR TOOTH DIM.		0	0	0
<CATEGORY C1>				
11)MAGNETIC PARTICLE		0	30	60
<CATEGORY C2>				
12)ULTRASONIC		0	0	0
13)X-RAY		0	300	600
SUB TOTAL		0	1,155	2,310

RECOMMENDABLE NUMBER OF TESTS AND INSPECTIONS

INDUSTRY	PROCESS EQUIPMENT		
	1985	1993	1998
NUMBER OF UNIT			

TESTS & INSPECTIONS	YEAR		
	1985	1993	1998
<CATEGORY A>			
1)BRINNEL HARDNESS	323	550	822
2)VICKERS HARDNESS	161	275	411
3)TENSILE	3,227	5,500	8,220
4)IMPACT	968	1,650	2,466
5)PROJECTOR	968	1,650	2,466
6)MICRO STRUCTURE	0	0	0
7)CHEMICAL ANALYSIS	3,227	5,500	8,220
<CATEGORY B>			
8)SURFACE ROUGHNESS	2,200	4,000	6,900
9)3-DIM. MEASUREMENT	0	0	0
10)GEAR TOOTH DIM.	2,200	4,000	6,900
<CATEGORY C1>			
11)MAGNETIC PARTICLE	405	740	1,132
<CATEGORY C2>			
12)ULTRASONIC	2,023	3,700	5,661
13)X-RAY	2,023	3,700	5,661
SUB TOTAL	17,725	31,265	48,859

DISTRIBUTION OF INDUSTRY BY REGION

INDUSTRY: MACHINE TOOL

COMMODITY	JABOTABEK	JAWA BARAT (EX.BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	(UNIT)	
						OTHERS	
LATHE	0	300	0	0	0	0	0
BENDING MACHINE	100	0	0	0	0	0	0
PRESS MACHINE	100	0	0	0	0	0	0
DRILL MACHINE	300	0	0	0	0	0	0
SHEARING M/C	100	0	0	0	0	0	0
T O T A L	600	300	0	0	0	0	0
DISTRIBUTION	0.67	0.33	0.00	0.00	0.00	0.00	0.00

SOURCE: DEPARTEMEN PERINDUSTRIAN

DISTRIBUTION OF INDUSTRY BY REGION

INDUSTRY: AGRICULTURE MACHINE

(UNIT: TON)

COMMODITY	JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	OTHERS
HULLER	0	29	240	396	24	12
THRESHER	6	0	440	142	34	0
TRACTOR(SMALL)	0	0	0	104	0	0
TRACTOR(LARGE)	3,432	0	0	0	0	0
RICE MILLER	0	0	690	173	25	0
RICE POLISHER	0	0	441	101	0	0
IRRIGATION PUMP	1,704	14	654	12	624	0
HAND TRACTOR	84	0	254	264	0	0
T O T A L	5,226	43	2,719	1,192	707	12
DISTRIBUTION	0.53	0.00	0.28	0.12	0.07	0.00

SOURCE: DEPARTEMEN PERINDUSTRIAN

DISTRIBUTION OF INDUSTRY BY REGION

INDUSTRY: CONSTRUCTION MACHINE

(UNIT: TON)

COMMODITY	JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	OTHERS
CRAWLER BULLDO.	25,560	0	0	0	0	0
HYDRAULIC EXCA.	9,450	0	0	0	0	0
MOTOR GRADER	2,933	0	0	0	0	0
WHEEL LOADER	5,950	0	0	0	0	0
T O T A L	43,893	0	0	0	0	0
DISTRIBUTION	1.00	0.00	0.00	0.00	0.00	0.00

SOURCE: DEPARTEMEN PERINDUSTRIAN

DISTRIBUTION OF INDUSTRY BY REGION

INDUSTRY: ELECTRIC MACHINE AND APPLIANCE

(UNIT: TON)

COMMODITY	JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	OTHERS
GENERATOR	2,300	0	0	89	120	0
KWH METER	2,640	0	0	0	0	0
ELECTRIC MOTOR	660	0	0	0	0	0
ELECTRIC PANEL	295	0	0	70	0	0
ELEC. TRANSFORM.	845	0	0	54	15	0
WIND FAN	4,200	0	0	0	0	0
ELEC. LAUNDRY	864	0	0	0	0	0
T O T A L	11,804	0	0	213	135	0
DISTRIBUTION	0.97	0.00	0.00	0.02	0.01	0.00

SOURCE: DEPARTEMEN PERINDUSTRIAN

DISTRIBUTION OF INDUSTRY BY REGION

INDUSTRY: AUTOMOBILE

(UNIT)

COMMODITY	JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	OTHERS
AUTO. ASSEMBLY	296,500	0	0	72,000	0	0
T O T A L	296,500	0	0	72,000	0	0
DISTRIBUTION	0.80	0.00	0.00	0.20	0.00	0.00

SOURCE: DEPARTEMEN PERINDUSTRIAN

DISTRIBUTION OF INDUSTRY BY REGION

INDUSTRY: MOTORCYCLE

(UNIT)

COMMODITY	JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	OTHERS
MOTORCYCLE ASSY	1,230,000	0	0	0	0	0
T O T A L	1,230,000	0	0	0	0	0
DISTRIBUTION	1.00	0.00	0.00	0.00	0.00	0.00

SOURCE: DEPARTEMEN PERINDUSTRIAN

DISTRIBUTION OF INDUSTRY BY REGION

INDUSTRY: DIESEL ENGINE

COMMODITY	JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	(UNIT)	
						OTHERS	
DIESEL ENGINE	48,464	0	28,000	29,000	0	0	0
T O T A L	48,464	0	28,000	29,000	0	0	0
DISTRIBUTION	0.46	0.00	0.27	0.27	0.00	0.00	0.00

SOURCE: DEPARTEMEN PERINDUSTRIAN

DISTRIBUTION OF INDUSTRY BY REGION

INDUSTRY: SHIP BUILDING

(UNIT: BRT)

COMMODITY	JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	OTHERS
SHIP BUILDING	53,200	0	12,950	25,750	23,600	8,900
T O T A L	53,200	0	12,950	25,750	23,600	8,900
DISTRIBUTION	0.43	0.00	0.10	0.21	0.19	0.07

SOURCE: DEPARTEMEN PERINDUSTRIAN

DISTRIBUTION OF INDUSTRY BY REGION

INDUSTRY: PROCESS EQUIPMENT

COMMODITY	JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	(UNIT: NUMBER OF EMPLOYEES)	
					SUMATERA	OTHERS
METAL PROCESSG	71,835	41,702	11,895	41,389	12,530	2,290
T O T A L	71,835	41,702	11,895	41,389	12,530	2,290
DISTRIBUTION	0.40	0.23	0.07	0.23	0.08	0.01

SOURCE: BPS

NOTE: ESTIMATED FROM THE NUMBER OF PEOPLE ENGAGED WITH METAL PROCESSING IND.

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	MACHINE TOOL			
YEAR	1985	1993	1998	
NUMBER OF UNIT	1,208	15,000	21,667	

TESTS	REGION	JABOTABEK				JAYA BARAT-EX. JABOTABEK				JAYA TENGAH				JAYA TIMUR				SUMATERA				OTHERS				TOTAL			
		YEAR	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998			
INSPECTIONS	RATIO	0.67	0.67	0.67	0.67	0.33	0.33	0.33	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<CATEGORY A>																													
1)BRINELL HARDNESS		3	141	549	1	70	319																						
2)VICERS HARDNESS		1	105	941	1	51	404																						
3)TENSILE		25	1,414	8,487	14	697	3,195																						
4)IMPACT		9	424	1,946	4	209	958																						
5)PROJECTOR		9	424	1,946	4	209	958																						
6)MICRO STRUCTURE		0	951	13,709	0	469	8,762																						
7)CHEMICAL ANALYSIS		29	1,414	8,487	14	697	3,195																						
<CATEGORY B>																													
8)SURFACE ROUGHNESS		121	1,675	5,807	60	825	2,890																						
9)3-DIM. MEASUREMENT		121	1,675	5,807	60	825	2,890																						
10)GEAR TOOTH DIM.		121	1,675	5,807	60	825	2,890																						
<CATEGORY C>																													
11)MAGNETIC PARTICLE		2	40	136	1	19	68																						
<CATEGORY D>																													
12)ULTRASONIC		0	0	0	0	0	0																						
13)X-RAY		0	0	0	0	0	0																						
SUB TOTAL		445	9,959	49,723	219	4,695	24,490																						

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	AGRICULTURE MACHINE		
YEAR	1985	1990	1998
NUMBER OF UNIT	11,892	33,343	85,110

TESTS			REGION		JIBOTANEY			JAYA UARAT-EX. JABOTABEY			JAYA TEMCAN			JAYA TIKUR			SUKATERA			OTHERS			TOTAL		
YEAR	RATIO	INSPECTIONS	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998		
			0.53	0.53	0.53	0	0	0	0.28	0.28	0.28	0.12	0.12	0.12	0.07	0.07	0.07	0	0	0	0	0	0		
CATEGORY A																									
1)BRINELL HARDNESS		29	135	444	0	0	0	16	72	234	0	31	100	4	18	55	0	0	0	54	257	837			
2)VICIERS HARDNESS		15	86	222	0	0	0	8	36	117	3	15	50	2	3	23	0	0	0	28	129	419			
3)TENSILE		287	1,305	4,440	0	0	0	152	721	2,340	65	309	1,005	38	180	568	0	0	0	542	2,575	8,377			
4)IMPACT		88	409	1,332	0	0	0	46	218	704	19	93	302	11	54	170	0	0	0	182	772	2,513			
5)PROJECTOR		86	409	1,332	0	0	0	46	218	704	19	93	302	11	54	178	0	0	0	162	772	2,513			
6)MICRO STRUCTURE		48	421	1,806	0	0	0	25	222	956	11	55	403	8	60	235	0	0	0	90	794	3,412			
7)CHEMICAL ANALYSIS		287	1,305	4,440	0	0	0	152	721	2,340	65	309	1,005	38	180	580	0	0	0	542	2,575	8,377			
CATEGORY B																									
8)SURFACE ROUGHNESS		47	221	789	0	0	0	25	117	417	11	50	170	6	23	104	0	0	0	89	417	1,489			
9)3-DIM. MEASUREMENT		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10)GEAR TOOTH DIN.		47	221	789	0	0	0	25	117	417	11	50	170	6	23	104	0	0	0	89	417	1,489			
CATEGORY C1																									
11)MAGNETIC PARTICLE		35	180	656	0	0	0	10	38	352	8	42	151	5	25	88	0	0	0	66	350	1,257			
CATEGORY C2																									
12)ULTRASONIC		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
13)X-RAY		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
GRAND TOTAL		907	4,801	16,202	0	0	0	511	2,530	8,591	219	1,087	3,682	128	634	2,148	0	0	0	1,824	9,068	30,683			

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	CONSTRUCTION MACHINE			
	YEAR	1985	1993	1998
	NUMBER OF UNIT	1,914	2,442	3,116

TESTS	REGION	JAUOTAREK				JAYA BARAT-ER. JAUOTAREK				JAYA TENGKAI				JAYA TIMUR				SUMATERA				OTHERS				TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
		YEAR	1985	1993	1998	1985	1993	1998	1998	1985	1993	1998	1998	1985	1993	1998	1998	1985	1993	1998	1998	1985	1993	1998	1998	1985	1993	1998																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
																													RATIO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	ELECTRICAL MACHINE		
	1985	1993	1998
NUMBER OF UNIT	2.44X	3.834X	0.002X

TESTS	REGION JABOTABEK			JAYA BARIT-EX. JABOTABEK			JAYA TENGAH			JAYA TIMUR			SUMATERA			OTHERS			TOTAL		
	YEAR	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998		
INSPECTIONS	RATIO	0.97	0.97	0.97	0	0	0	0	0	0	0.02	0.02	0.02	0.02	0.01	0.01	0	0	0	1	
<CATEGORY A>																					
1) RIMMEL HARDNESS				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2) VICKERS HARDNESS				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3) TENSILE				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4) IMPACT				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5) PROJECTOR				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6) MICRO STRUCTURE				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7) CHEMICAL ANALYSIS				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<CATEGORY B>																					
8) SURFACE ROUGHNESS				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9) 3-DIM. MEASUREMENT				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10) GEAR TOOTH DIM.				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<CATEGORY C1>																					
11) MAGNETIC PARTICLE				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<CATEGORY C2>																					
12) ULTRASONIC				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13) X-RAY				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SUB TOTAL				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	ELECTRIC APPLIANCES			
	1985	1993	1998	
YEAR				
NUMBER OF UNIT	8,350X	10,700X	13,826X	

TESTS	REGION	JABOTABEK				JAYA BARAT-EX-JAROTABEK				JAYA TENGGH				JAYA TIMOR				SUMATERA				OTHERS				TOTAL			
		1985	1993	1998		1985	1993	1998		1985	1993	1998		1985	1993	1998		1985	1993	1998		1985	1993	1998		1985	1993	1998	
INSPECTIONS	RATIO	0.97	0.97	0.97		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
<CATEGORY A>																													
1)BRINELL HARDNESS		0	63	81		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
2)TICKERS HARDNESS		0	32	40		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
3)TENSILE		0	631	803		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
4)IMPACT		0	180	241		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
5)PROJECTOR		0	180	241		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
6)MICRO STRUCTURE		0	631	803		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
7)CHEMICAL ANALYSIS		0	831	803		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
<CATEGORY B>																													
8)SURFACE ROUGHNESS		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
9)3-DIM. MEASUREMENT		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
10)GEAR TOOTH DIX.		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
<CATEGORY C1>																													
11)MAGNETIC PARTICLE		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
<CATEGORY C2>																													
12)ULTRASONIC		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
13)X-RAY		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
SUB TOTAL		0	2,565	3,011		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	2,438	3,104	

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	AUTOMOTIVE			
	1985	1993	1998	2001
NUMBER OF UNIT	1985	1993	1998	2001

TESTS	REGION	JABOTABEK				JAWA BARAT-EX. JABOTABEK				JAWA TENGAH				JAWA TIMUR				SUKATERA				OTHERS				TOTAL						
		YEAR	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998			
INSPECTIONS	RATIO	0.8	0.8	0.8	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<CATEGORY A>																																
1)BRINELL HARDNESS		0	2,718	5,558		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
2)VICKERS HARDNESS		0	1,368	2,879		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
3)TENSILE		0	27,178	55,580		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4)IMPACT		0	8,164	10,670		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5)PROJECTOR		0	8,154	19,670		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6)MICRO STRUCTURE		0	24,588	50,450		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7)CHEMICAL ANALYSIS		0	27,178	55,580		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<CATEGORY B>																																
8)SURFACE ROUGHNESS		0	439	708		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9)3-DIM. MEASUREMENT		0	439	708		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10)GEAR TOOTH DIX.		0	439	708		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<CATEGORY C1>																																
11)MAGNETIC PARTICLE		0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<CATEGORY C2>																																
12)ULTRASONIC		0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13)X-RAY		0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SUB TOTAL		0	100,652	205,538		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	MOTORCYCLE			
	1985	1993	1998	
NUMBER OF UNIT	248	503K	810K	

TESTS	REGION	JABOTABEK			JAWA BARAT-EX. JABOTABEK			JAWA TENGAH			JAWA TIMUR			SUMATERA			OTHERS			TOTAL
		1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	
INSPECTIONS	YEAR	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	RATIO																			
-CATEGORY A-																				
1) RIMMEL HARDNESS		0	1,583	3,145	0	0	0	0	0	0	0	0	0	0	0	0	0	1,583	3,145	
2) TACKERS HARDNESS		0	804	1,745	0	0	0	0	0	0	0	0	0	0	0	0	0	804	1,745	
3) TENSILE		0	15,823	31,452	0	0	0	0	0	0	0	0	0	0	0	0	0	15,823	31,452	
4) IMPACT		0	4,747	9,435	0	0	0	0	0	0	0	0	0	0	0	0	0	4,747	9,435	
5) PROJECTOR		0	4,747	9,435	0	0	0	0	0	0	0	0	0	0	0	0	0	4,747	9,435	
6) MICRO STRUCTURE		0	14,750	32,037	0	0	0	0	0	0	0	0	0	0	0	0	0	14,750	32,037	
7) CHEMICAL ANALYSIS		0	15,823	31,452	0	0	0	0	0	0	0	0	0	0	0	0	0	15,823	31,452	
-CATEGORY B-																				
8) SURFACE ROUGHNESS		124	755	1,215	0	0	0	0	0	0	0	0	0	0	0	0	0	755	1,215	
9) DIX. MEASUREMENT		124	755	1,215	0	0	0	0	0	0	0	0	0	0	0	0	0	755	1,215	
10) GEAR TOOTH DIX.		124	755	1,215	0	0	0	0	0	0	0	0	0	0	0	0	0	755	1,215	
-CATEGORY C1-																				
11) MAGNETIC PARTICLE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-CATEGORY C2-																				
12) ULTRASONIC		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13) X-RAY		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SUB TOTAL			372	80,542	122,946													372	80,542	122,946

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	DIESEL ENGINE			
	1985	1993	1998	
YEAR				
NUMBER OF UNIT	56K	150.72K	236.08K	

TESTS	REGION	JABDIANEK				JAYA BARAT-EX. JABOTABEK				JAYA TENGKIH				JAYA TIMUR				SUMATERA				OTHERS				TOTAL					
		YEAR	INSPECTIONS			1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998		
			RATIO	0.48	0.46																									0.46	
<CATEGORY A>																															
1)BRINELL HARDNESS		0	55	285		0	0	0		32	107		0	32	107		0	0	0		0	0	0	0	0	0	0	113	619		
2)VICKERS HARDNESS		0	31	193		0	0	0		18	111		0	18	111		0	0	0		0	0	0	0	0	0	0	68	411		
3)TENSILE		0	548	2,847		0	0	0		322	1,671		0	322	1,671		0	0	0		0	0	0	0	0	0	0	1,191	6,190		
4)IMPACT		0	165	854		0	0	0		97	501		0	97	501		0	0	0		0	0	0	0	0	0	0	368	1,867		
5)PROJECTOR		0	165	854		0	0	0		97	501		0	97	501		0	0	0		0	0	0	0	0	0	0	368	1,867		
6)MICRO STRUCTURE		0	277	2,245		0	0	0		163	1,318		0	163	1,318		0	0	0		0	0	0	0	0	0	0	803	4,881		
7)CHEMICAL ANALYSIS		0	548	2,847		0	0	0		322	1,671		0	322	1,671		0	0	0		0	0	0	0	0	0	0	1,191	6,190		
<CATEGORY B>																															
8)SURFACE ROUGHNESS		44	208	547		0	0	0		26	122	321		20	122	321		0	0	0		0	0	0	0	0	98	452	1,190		
9)3-DIM. MEASUREMENT		44	208	547		0	0	0		26	122	321		26	122	321		0	0	0		0	0	0	0	0	96	452	1,190		
10)GEAR TOOTH DIM.		44	208	547		0	0	0		26	122	321		26	122	321		0	0	0		0	0	0	0	0	96	452	1,190		
<CATEGORY C1>																															
11)MAGNETIC PARTICLE		17	33	52		0	0	0		10	19	31		10	19	31		0	0	0		0	0	0	0	0	38	72	113		
<CATEGORY C2>																															
12)ULTRASONIC		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	0	0	0	0	0		
13)X-RAY		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	0	0	0	0	0		
SUB TOTAL		150	2,445	11,816		0	0	0		88	1,435	6,536		88	1,435	6,536		0	0	0		0	0	0	0	0	326	5,316	25,698		

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	SHIP BUILDING		
	1985	1993	1998
NUMBER OF UNIT			

TESTS	REGION			JABOTABEK			JAYA PARIT-EX. JABOTABEK			JAYA TENGAN			JAVA TIMOR			SUMATERA			OTHERS			TOTAL		
	YEAR	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1985	1993	1998	1993	1998
INSPECTIONS	RATIO	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
<CATEGORY A>																								
1) BRINELL HARDNESS		0	13	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2) VICKERS HARDNESS		0	6	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3) TENSILE		0	129	258	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4) IMPACT		0	39	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5) PROJECTOR		0	39	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6) MICRO STRUCTURE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7) CHEMICAL ANALYSIS		0	129	258	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<CATEGORY B>																								
8) SURFACE ROUGHNESS		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9) 3-DIM. MEASUREMENT		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10) GEAR TOOTH DIM.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<CATEGORY C1>																								
11) MAGNETIC PARTICLE		0	13	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<CATEGORY C2>																								
12) ULTRASONIC		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13) X-RAY		0	129	258	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUB TOTAL		0	437	903	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FLOW OF RECOMMENDABLE TESTS AND INSPECTIONS BY INDUSTRY AND REGION

INDUSTRY	PROCESS EQUIPMENT			
	YEAR	1985	1993	1998
NUMBER OF UNIT				

TESTS	REGION	JABOTABEK				JAYA BARAT-EX-JABOTABEK				JAYA TENGAH				JAYA TIMUR				SUMATRA				OTHERS				TOTAL			
		YEAR	1985	1993	1998	YEAR	1985	1993	1998	YEAR	1985	1993	1998	YEAR	1985	1993	1998	YEAR	1985	1993	1998	YEAR	1985	1993	1998	YEAR	1985	1993	1998
INSPECTIONS	RATIO	0.4	0.4	0.4	0.4	0.23	0.23	0.23	0.23	0.00	0.00	0.00	0.00	0.23	0.23	0.23	0.23	0.07	0.07	0.07	0.07	0.01	0.01	0.01	0.01	1	1	1	1
<CATEGORY A>																													
1) DRINKING WATER		120	220	320	320	74	127	180	180	33	33	49	49	74	127	180	180	23	23	39	39	3	3	3	3	323	550	822	822
2) CEMENT HARDNESS		64	110	164	164	37	83	95	95	17	17	25	25	37	83	95	95	11	11	19	19	2	2	2	2	161	275	411	411
3) TENSILE		1,291	2,200	3,268	3,268	742	1,265	1,891	1,891	330	330	493	493	742	1,265	1,891	1,891	220	220	385	385	32	32	32	32	3,227	5,500	8,220	8,220
4) IMPACT		387	600	900	900	223	380	567	567	58	58	86	86	223	380	567	567	68	68	110	110	10	10	10	10	908	1,650	2,468	2,468
5) PROJECTOR		387	600	900	900	223	380	567	567	58	58	86	86	223	380	567	567	68	68	110	110	10	10	10	10	908	1,650	2,468	2,468
6) MICRO STRUCTURE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7) CHEMICAL ANALYSIS		1,291	2,200	3,268	3,268	742	1,265	1,891	1,891	330	330	493	493	742	1,265	1,891	1,891	220	220	385	385	32	32	32	32	3,227	5,500	8,220	8,220
<CATEGORY B>																													
8) SURFACE ROUGHNESS		800	1,000	2,760	2,760	500	920	1,587	1,587	240	240	414	414	500	920	1,587	1,587	154	154	260	260	22	22	22	22	2,200	4,000	6,900	6,900
9) 3-DIM. MEASUREMENT		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10) GEAR TOOTH DIA.		800	1,000	2,760	2,760	500	920	1,587	1,587	240	240	414	414	500	920	1,587	1,587	154	154	260	260	22	22	22	22	2,200	4,000	6,900	6,900
<CATEGORY C1>																													
11) MAGNETIC PARTICLE		162	296	453	453	93	170	260	260	24	24	68	68	93	170	260	260	28	28	52	52	4	4	4	4	405	740	1,132	1,132
<CATEGORY C2>																													
12) ULTRASONIC		808	1,400	2,264	2,264	465	851	1,302	1,302	222	222	340	340	465	851	1,302	1,302	142	142	250	250	20	20	20	20	2,023	3,700	5,661	5,661
13) X-RAY		808	1,400	2,264	2,264	465	851	1,302	1,302	222	222	340	340	465	851	1,302	1,302	142	142	250	250	20	20	20	20	2,023	3,700	5,661	5,661
SUB TOTAL		7,030	12,500	19,544	19,544	4,077	7,191	11,238	11,238	1,876	1,876	2,932	2,932	4,077	7,191	11,238	11,238	1,241	1,241	2,169	2,169	177	177	177	177	17,725	31,285	48,859	48,859

FLOW OF TESTS AND INSPECTIONS IN JABOTABEK

TESTS &		REGION	JABOTABEK									
INSPECTIONS		YEAR	1985	1986	1987	1988	1989	1990	1991	1992	1993	
<CATEGORY A>												
1)BRINNEL HARDNESS		177		272	417	639	980	1,502	2,304	3,533	5,417	
2)VICERS HARDNESS		89		137	211	324	498	766	1,177	1,809	2,779	
3)TENSILE		1,777		2,724	4,175	6,400	9,811	15,039	23,053	35,337	54,168	
4)IMPACT		533		817	1,253	1,920	2,944	4,512	6,916	10,601	16,250	
5)PROJECTOR		533		817	1,253	1,920	2,944	4,512	6,916	10,601	16,250	
6)MICRO STRUCTURE		166		335	675	1,360	2,741	5,525	11,137	22,449	45,252	
7)CHEMICAL ANALYSIS		1,777		2,724	4,175	6,400	9,811	15,039	23,053	35,337	54,168	
<CATEGORY B>												
8)SURFACE ROUGHNESS		1,790		2,087	2,434	2,838	3,310	3,859	4,500	5,248	6,119	
9)3-DIM. MEASUREMENT		289		389	522	702	943	1,268	1,704	2,290	3,077	
10)GEAR TOOTH DIM.		1,790		2,087	2,434	2,838	3,310	3,859	4,500	5,248	6,119	
<CATEGORY C1>												
11)MAGNETIC PARTICLE		302		384	487	617	783	993	1,260	1,598	2,027	
<CATEGORY C2>												
12)ULTRASONIC		809		873	941	1,015	1,094	1,180	1,273	1,372	1,480	
13)X-RAY		809		882	961	1,047	1,141	1,243	1,355	1,477	1,609	
SUB TOTAL		10,843		14,527	19,937	28,021	40,308	59,297	89,147	136,899	214,717	

FLOW OF TESTS AND INSPECTIONS IN JAWA BARAT-EX.(EXCLUDING JABOTABEK)

TESTS & INSPECTIONS		REGION	JAWA BARAT-EX. JABOTABEK									
		YEAR	1985	1986	1987	1988	1989	1990	1991	1992	1993	
<CATEGORY A>												
1)BRINNEL HARDNESS		75	85	96	108	122	137	155	174	197		
2)VICKERS HARDNESS		38	44	50	57	66	76	87	100	114		
3)TENSILE		756	852	960	1,081	1,218	1,372	1,546	1,742	1,982		
4)IMPACT		227	255	288	324	365	411	464	522	589		
5)PROJECTOR		227	255	288	324	365	411	464	522	589		
6)MICRO STRUCTURE		0	2	5	10	22	47	101	217	469		
7)CHEMICAL ANALYSIS		756	852	960	1,081	1,218	1,372	1,546	1,742	1,982		
<CATEGORY B>												
8)SURFACE ROUGHNESS		566	652	750	863	994	1,144	1,317	1,516	1,745		
9)3-DIM. MEASUREMENT		60	83	116	160	222	309	426	595	825		
10)GEAR TOOTH DIM.		508	652	750	863	994	1,144	1,317	1,516	1,745		
<CATEGORY C1>												
11)MAGNETIC PARTICLE		94	103	112	122	133	146	159	173	189		
<CATEGORY C2>												
12)ULTRASONIC		405	502	541	584	629	679	732	789	851		
13)X-RAY		465	502	541	584	629	679	732	789	851		
SUB TOTAL		4,296	4,838	5,455	6,182	6,976	7,926	9,046	10,397	12,087		

FLOW OF TESTS AND INSPECTIONS IN JAWA TENGAH

TESTS &		REGION	JAWA TENGAH									
INSPECTIONS	YEAR		1985	1986	1987	1988	1989	1990	1991	1992	1993	
<CATEGORY A>												
1)BRINNEL HARDNESS			34	41	49	58	69	83	99	118	140	
2)VICKERS HARDNESS			18	21	25	30	36	43	51	61	72	
3)TENSILE			346	412	491	584	696	829	988	1,177	1,403	
4)IMPACT			103	123	147	175	208	248	296	353	421	
5)PROJECTOR			103	123	147	175	208	248	296	353	421	
6)MICRO STRUCTURE			25	35	50	70	98	138	194	273	385	
7)CHEMICAL ANALYSIS			346	412	491	584	696	829	988	1,177	1,403	
<CATEGORY B>												
8)SURFACE ROUGHNESS			183	206	233	262	296	334	377	425	479	
9)3-DIM. MEASUREMENT			26	31	38	46	56	68	83	101	122	
10)GEAR TOOTH DIM.			183	206	233	262	296	334	377	425	479	
<CATEGORY C1>												
11)MAGNETIC PARTICLE			53	61	70	81	93	107	124	143	165	
<CATEGORY C2>												
12)ULTRASONIC			121	131	141	152	164	177	191	206	222	
13)X-RAY			121	133	146	160	175	192	210	230	252	
SUB TOTAL			1,662	1,935	2,258	2,640	3,033	3,631	4,273	5,041	5,963	

FLOW OF TESTS AND INSPECTIONS IN JAWA TIMUR

TESTS & INSPECTIONS		REGION	JAWA TIMUR									
		YEAR	1985	1986	1987	1988	1989	1990	1991	1992	1993	
<CATEGORY A>												
1)BRINNEL HARDNESS		80	108	146	197	265	358	482	650	876		
2)VICKERS HARDNESS		40	54	73	89	133	180	243	328	442		
3)TENSILE		807	1,088	1,465	1,974	2,660	3,584	4,829	6,508	8,766		
4)IMPACT		242	326	439	592	797	1,075	1,448	1,952	2,630		
5)PROJECTOR		242	326	439	592	797	1,075	1,448	1,952	2,630		
6)MICRO STRUCTURE		11	24	54	120	266	589	1,306	2,895	6,418		
7)CHEMICAL ANALYSIS		807	1,088	1,465	1,974	2,660	3,584	4,829	6,508	8,766		
<CATEGORY B>												
8)SURFACE ROUGHNESS		543	600	662	731	808	892	985	1,088	1,202		
9)3-DIM. MEASUREMENT		26	34	45	59	78	102	134	176	232		
10)GEAR TOOTH DIM.		543	600	662	731	808	892	985	1,088	1,202		
<CATEGORY C1>												
11)MAGNETIC PARTICLE		111	122	135	148	163	179	197	216	238		
<CATEGORY C2>												
12)ULTRASONIC		465	502	541	584	629	679	732	789	851		
13)X-RAY		465	506	551	599	652	710	772	840	914		
SUB TOTAL		4,383	5,377	6,677	8,400	10,718	13,897	18,390	24,987	35,168		

FLOW OF TESTS AND INSPECTIONS IN SUMATERA

TESTS & INSPECTIONS		REGION	SUMATERA								
YEAR			1985	1986	1987	1988	1989	1990	1991	1992	1993
<CATEGORY A>											
1)BRINNEL HARDNESS			27	30	33	37	41	46	51	57	63
2)VICKERS HARDNESS			13	15	18	18	20	23	25	28	31
3)TENSILE			264	294	328	365	407	454	506	564	629
4)IMPACT			79	88	98	109	122	136	152	169	189
5)PROJECTOR			79	88	98	109	122	136	152	169	189
6)MICRO STRUCTURE			6	8	11	14	19	26	35	46	62
7)CHEMICAL ANALYSIS			264	294	328	365	407	454	506	564	629
<CATEGORY B>											
8)SURFACE ROUGHNESS			160	174	189	205	222	241	262	285	309
9)3-DIM. MEASUREMENT			0	0	0	0	0	0	0	0	0
10)GEAR TOOTH DIM.			160	174	189	205	222	241	262	285	309
<CATEGORY C1>											
11)MAGNETIC PARTICLE			33	37	42	47	52	59	66	74	83
<CATEGORY C2>											
12)ULTRASONIC			142	153	165	178	192	207	223	240	259
13)X-RAY			142	157	173	191	212	234	259	286	316
SUB TOTAL			1,308	1,510	1,669	1,844	2,039	2,256	2,498	2,767	3,067

FLOW OF TESTS AND INSPECTIONS IN OTHER REGIONS

TESTS & INSPECTIONS	REGION	OTHERS										
		1985	1986	1987	1988	1989	1990	1991	1992	1993		
<CATEGORY A>												
1)BRINNEL HARDNESS		3	4	4	4	5	6	6	7	8		
2)VICKERS HARDNESS		2	2	2	2	2	3	3	3	4		
3>TENSILE		32	36	40	44	50	55	61	68	76		
4)IMPACT		10	11	12	13	15	17	18	20	23		
5)PROJECTOR		10	11	12	13	15	17	18	20	23		
6)MICRO STRUCTURE		0	0	0	0	0	0	0	0	0		
7)CHEMICAL ANALYSIS		32	36	40	44	50	55	61	68	76		
<CATEGORY B>												
8)SURFACE ROUGHNESS		22	24	26	28	30	32	34	37	40		
9)3-DIM. MEASUREMENT		0	0	0	0	0	0	0	0	0		
10)GEAR TOOTH DIM.		22	24	26	28	30	32	34	37	40		
<CATEGORY C1>												
11)MAGNETIC PARTICLE		4	5	5	6	6	7	8	9	10		
<CATEGORY C2>												
12)ULTRASONIC		20	22	24	25	27	30	32	34	37		
13)X-RAY		20	23	26	30	34	39	45	51	58		
SUB TOTAL		177	196	216	238	263	291	322	356	394		

SERVICES OF B4T BY REGION, 1987

TESTS & INSPECTIONS	JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	OTHERS	TOTAL
1) BRINNEL HARDNESS	59	56	45	121	50	6	337
2) VICKERS HARDNESS	34	25	4	4	8	0	75
3) TENSILE	1,011	412	60	201	52	7	1,743
4) IMPACT	60	11	27	80	3	4	185
5) PROJECTOR	0	0	0	0	0	0	0
6) MICRO STRUCTURE	3	1	16	51	5	1	77
7) CHEMICAL ANALYSIS	13	19	7	28	4	0	71
8) SURFACE ROUGHNESS	385	888	47	62	20	1	1,403
9) 3-DIM. MEASUREMENT	11	23	2	2	0	0	38
10) GEAR TOOTH DIM.	1,170	495	84	231	75	9	2,064
11) MAGNETIC PARTICLE	0	0	0	0	0	0	0
12) ULTRASONIC	14	23	1	5	0	0	43
13) X-RAY	4	11	3	35	2	1	56
14) CALIB. OF MEASURE.	133	179	0	53	0	0	375
TOTAL	2,897	2,143	296	883	219	29	6,467

SOURCE: B4T

ADJUSTED FLOW OF TESTS AND INSPECTIONS IN JABOTABEK

TESTS & INSPECTIONS	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<CATEGORY A>																		
1)BRINNEL HARDNESS	70	107	184	251	385	590	905	1,388	2,128	2,488	2,908	3,400	3,975	4,647	5,432	6,350	7,423	8,678
2)VICKERS HARDNESS	35	54	83	127	196	301	462	711	1,092	1,313	1,578	1,897	2,281	2,743	3,288	3,965	4,767	5,731
3>TENSILE	698	1,070	1,640	2,514	3,854	5,908	9,056	13,882	21,280	24,878	29,083	34,000	39,748	46,488	54,324	63,507	74,244	86,795
4)IMPACT	209	321	492	754	1,159	1,773	2,717	4,165	6,384	7,463	8,725	10,200	11,924	13,940	16,286	19,051	22,271	26,036
5)PROJECTOR	209	321	492	754	1,159	1,773	2,717	4,165	6,384	7,463	8,725	10,200	11,924	13,940	16,286	19,051	22,271	26,036
6)MICRO STRUCTURE	65	131	265	534	1,077	2,170	4,375	8,819	17,777	21,384	25,674	30,853	37,077	44,557	53,545	64,347	77,328	92,928
7)CHEMICAL ANALYSIS	698	1,070	1,640	2,514	3,854	5,908	9,056	13,882	21,280	24,878	29,083	34,000	39,748	46,488	54,324	63,507	74,244	86,795
<CATEGORY B>																		
8)SURFACE ROUGHNESS	703	820	956	1,115	1,300	1,516	1,768	2,062	2,404	2,837	3,348	3,951	4,663	5,503	6,434	7,564	9,045	10,674
9)3-DIM. MEASUREMENT	114	153	205	276	371	498	669	899	1,209	1,473	1,796	2,189	2,668	3,252	3,963	4,831	5,888	7,177
10)GEAR TOOTH DIM.	703	820	956	1,115	1,300	1,516	1,768	2,062	2,404	2,837	3,348	3,951	4,663	5,503	6,434	7,564	9,045	10,674
<CATEGORY C1>																		
11)MAGNETIC PARTICLE	119	151	191	243	308	390	495	628	796	938	1,104	1,300	1,531	1,803	2,123	2,499	2,943	3,465
<CATEGORY C2>																		
12)ULTRASONIC	318	343	370	399	430	464	500	539	581	633	689	750	817	890	969	1,055	1,148	1,250
13)X-RAY	318	346	377	411	448	488	532	580	632	692	757	828	908	991	1,084	1,186	1,298	1,420
SUB TOTAL	4,260	5,707	7,832	11,008	15,835	23,295	35,021	53,781	84,352	99,255	116,818	137,519	181,924	190,701	224,841	264,677	311,915	387,660

ADJUSTED FLOW OF TESTS AND INSPECTIONS IN JAVA BARAT

TESTS & INSPECTIONS	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<CATEGORY A>																		
1)BRINNEL HARDNESS	30	33	38	42	48	54	61	68	77	93	113	136	165	200	241	292	353	427
2)VICKERS HARDNESS	15	17	20	23	26	30	34	39	45	62	85	116	160	219	301	414	569	781
3)TENSILE	297	335	377	425	479	539	607	684	771	933	1,128	1,365	1,651	1,998	2,417	2,924	3,538	4,280
4)IMPACT	89	100	113	127	143	162	182	205	231	280	338	409	495	599	725	877	1,081	1,284
5)PROJECTOR	89	100	113	127	143	162	182	205	231	280	338	409	495	599	725	877	1,081	1,284
6)MICRO STRUCTURE	0	1	2	4	9	16	40	86	184	314	535	913	1,558	2,653	4,522	7,708	13,141	22,401
7)CHEMICAL ANALYSIS	297	335	377	425	479	539	607	684	771	933	1,128	1,365	1,651	1,998	2,417	2,924	3,538	4,280
<CATEGORY B>																		
8)SURFACE ROUGHNESS	222	256	295	339	390	449	517	598	688	827	997	1,202	1,449	1,747	2,108	2,540	3,062	3,692
9)3-DIM. MEASUREMENT	24	33	45	63	87	121	168	234	324	416	533	683	876	1,124	1,441	1,847	2,389	3,038
10)GEAR TOOTH DIM.	222	256	295	339	390	449	517	598	688	827	997	1,202	1,449	1,747	2,108	2,540	3,062	3,692
<CATEGORY C1>																		
11)MAGNETIC PARTICLE	37	40	44	48	52	57	62	68	74	83	93	103	116	129	144	161	180	201
<CATEGORY C2>																		
12)ULTRASONIC	183	197	213	229	247	267	287	310	334	364	396	431	470	512	557	606	660	719
13)X-RAY	183	197	213	229	247	267	287	310	334	364	396	431	470	512	557	606	660	719
SUB TOTAL	1,088	1,901	2,143	2,421	2,741	3,114	3,554	4,085	4,748	5,773	7,078	8,787	11,003	14,035	18,260	24,317	33,253	46,787

ADJUSTED FLOW OF TESTS AND INSPECTIONS IN JAYA TENGAH

TESTS & INSPECTIONS	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<CATEGORY A>																		
1)BRINHEL. HARDNESS	14	16	19	23	27	33	39	46	55	70	88	112	142	179	227	288	364	461
2)VICKERS HARDNESS	7	8	10	12	14	17	20	24	28	37	47	61	78	100	129	166	214	278
3)TENSILE	136	162	193	230	274	320	388	462	551	688	884	1,119	1,418	1,796	2,274	2,880	3,648	4,620
4)IMPACT	40	48	58	69	82	98	116	139	165	209	265	338	425	539	682	864	1,095	1,387
5)PROJECTOR	40	48	58	69	82	98	116	139	165	209	265	338	425	539	682	864	1,095	1,387
6)MICRO STRUCTURE	10	14	19	27	39	54	78	107	151	216	308	439	628	893	1,274	1,817	2,592	3,897
7)CHEMICAL ANALYSIS	136	162	193	230	274	320	388	462	551	688	884	1,119	1,418	1,796	2,274	2,880	3,648	4,620
<CATEGORY B>																		
8)SURFACE ROUGHNESS	72	81	91	103	116	131	148	167	188	224	267	319	380	453	540	643	766	914
9)3-DIM. MEASUREMENT	10	12	15	18	22	27	33	40	48	58	71	88	104	126	153	186	225	274
10)GEAR TOOTH DIM.	72	81	91	103	116	131	148	167	188	224	267	319	380	453	540	643	766	914
<CATEGORY C1>																		
11)MAGNETIC PARTICLE	21	24	27	32	37	42	49	56	65	79	97	119	146	179	220	269	330	405
<CATEGORY C2>																		
12)ULTRASONIC	48	51	55	60	64	70	75	81	87	95	103	113	123	133	145	158	172	188
13)X-RAY	48	52	57	63	69	75	82	90	99	103	119	131	143	157	172	189	207	227
SUB TOTAL	653	760	887	1,037	1,215	1,428	1,679	1,980	2,342	2,926	3,666	4,607	5,807	7,342	9,312	11,848	15,123	19,367

ADJUSTED FLOW OF TESTS AND INSPECTIONS IN JAVA TIMUR

TESTS & INSPECTIONS	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<CATEGORY A>																		
1)BRINELL HARDNESS	32	43	57	77	104	140	189	255	344	400	465	541	629	731	850	938	1,148	1,335
2)VICKERS HARDNESS	16	21	29	39	52	71	95	129	174	204	239	281	329	386	453	531	623	731
3>TENSILE	317	427	576	776	1,045	1,408	1,897	2,556	3,444	4,003	4,653	5,409	6,288	7,310	8,497	9,877	11,482	13,347
4)IMPACT	95	128	172	232	313	422	569	767	1,033	1,201	1,396	1,623	1,887	2,193	2,549	2,963	3,444	4,004
5)PROJECTOR	95	128	172	232	313	422	569	767	1,033	1,201	1,396	1,623	1,887	2,193	2,549	2,963	3,444	4,004
6)MICRO STRUCTURE	4	10	21	47	104	231	513	1,137	2,521	2,962	3,479	4,087	4,801	5,640	6,525	7,783	9,142	10,740
7)CHEMICAL ANALYSIS	317	427	576	776	1,045	1,408	1,897	2,556	3,444	4,003	4,653	5,409	6,288	7,310	8,497	9,877	11,482	13,347
<CATEGORY B>																		
8)SURFACE ROUGHNESS	213	236	280	287	317	350	387	427	472	536	608	690	784	890	1,010	1,146	1,301	1,476
9)3-DIM. MEASUREMENT	10	13	18	23	30	40	53	69	91	106	124	144	168	196	228	266	310	361
10)GEAR TOOTH DIM.	213	236	280	287	317	350	387	427	472	536	608	690	784	890	1,010	1,146	1,301	1,476
<CATEGORY C1>																		
11)MAGNETIC PARTICLE	44	48	53	58	64	70	77	85	93	106	121	138	157	179	203	231	263	300
<CATEGORY C2>																		
12)ULTRASONIC	183	197	213	229	247	267	287	310	334	364	396	431	470	512	557	606	660	719
13)X-RAY	183	199	216	235	256	279	303	330	359	393	429	469	513	561	613	671	733	802
SUB TOTAL	1,722	2,112	2,823	3,300	4,210	5,459	7,225	9,816	13,816	16,015	18,570	21,537	24,983	28,988	33,641	39,049	45,334	52,641

ADJUSTED FLOW OF TESTS AND INSPECTIONS IN SUMATERA

TESTS & INSPECTIONS	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<CATEGORY A>																		
1)BRINELL HARDNESS	10	12	13	14	16	18	20	22	25	29	33	38	44	50	58	67	77	88
2)VICKERS HARDNESS	5	6	6	7	8	9	10	11	12	14	16	19	22	25	29	34	39	45
3)TENSILE	104	116	129	144	160	178	199	222	247	285	329	379	437	505	582	671	774	893
4)IMPACT	31	35	38	43	48	53	60	66	74	85	99	114	131	151	174	201	232	267
5)PROJECTOR	31	35	38	43	48	53	60	66	74	85	99	114	131	151	174	201	232	267
6)MICRO STRUCTURE	2	3	4	6	8	10	14	18	24	32	42	56	74	97	128	169	222	293
7)CHEMICAL ANALYSIS	104	116	129	144	160	178	199	222	247	285	329	379	437	505	582	671	774	893
<CATEGORY B>																		
8)SURFACE ROUGHNESS	63	68	74	80	87	95	103	112	121	138	157	178	203	231	262	298	339	385
9)3-DIM. MEASUREMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10)GEAR TOOTH DIM.	63	68	74	80	87	95	103	112	121	138	157	178	203	231	262	298	339	385
<CATEGORY C1>																		
11)MAGNETIC PARTICLE	13	15	16	18	21	23	26	29	32	38	44	52	60	70	82	96	112	130
<CATEGORY C2>																		
12)ULTRASONIC	50	60	65	70	75	81	87	94	102	111	121	131	143	156	169	185	201	219
13)X-RAY	56	62	68	75	83	92	102	112	124	137	150	165	182	200	221	243	267	294
SUB TOTAL	537	593	658	725	801	886	981	1,087	1,205	1,377	1,575	1,804	2,067	2,372	2,724	3,133	3,608	4,162

ADJUSTED FLOW OF TESTS AND INSPECTIONS IN OTHER REGIONS

TESTS & INSPECTIONS	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<CATEGORY A>																		
1)BRINNEL HARDNESS	1	1	2	2	2	2	2	3	3	3	4	4	4	5	5	6	7	7
2)VICKERS HARDNESS	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	4
3)TENSILE	13	14	16	17	19	22	24	27	30	33	36	40	44	49	54	59	66	72
4)IMPACT	4	4	5	5	6	6	7	8	9	10	11	12	13	15	16	18	20	22
5)PROJECTOR	4	4	5	5	6	6	7	8	9	10	11	12	13	15	16	18	20	22
6)MICRO STRUCTURE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7)CHEMICAL ANALYSIS	13	14	16	17	19	22	24	27	30	33	36	40	44	49	54	59	66	72
<CATEGORY B>																		
8)SURFACE ROUGHNESS	9	9	10	11	12	13	14	15	16	18	20	22	24	27	30	34	38	42
9)3-DIM. MEASUREMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10)GEAR TOOTH DIM.	9	9	10	11	12	13	14	15	16	18	20	22	24	27	30	34	38	42
<CATEGORY C1>																		
11)MAGNETIC PARTICLE	2	2	2	2	2	3	3	3	4	4	5	5	6	6	7	7	8	9
<CATEGORY C2>																		
12)ULTRASONIC	8	9	9	10	11	12	12	13	15	16	17	19	20	22	24	26	29	31
13)X-RAY	6	9	10	12	13	15	16	20	23	25	28	31	35	39	43	48	53	59
SUB TOTAL	70	77	85	94	103	114	126	140	155	171	189	209	231	255	263	312	348	382

SERVICES OF MIDC BY REGION, 1984-1986

SERVICES OF MIDC		JABOTABEK	JAWA BARAT (EX. BOTABEK)	JAWA TENGAH	JAWA TIMUR	SUMATERA	OTHERS	TOTAL
TRAINING	AT MIDC	21	9	5	4	11	5	55
	OJT	3	0	0	0	0	0	3
	SEMINAR	5	1	0	0	0	0	6
	SUB TOTAL	29	10	5	4	11	5	64
R&D	FOUNDRY	1	7	0	1	0	0	9
	MACHINING	0	1	0	0	0	0	1
	WELDING	0	3	0	0	0	0	3
	OTHERS	7	26	1	0	0	1	35
	SUB TOTAL	8	37	1	1	0	1	48
T/A	FOUNDRY	14	20	13	4	1	2	54
	MACHINING	3	6	6	0	0	0	15
	WELDING	1	4	0	1	0	1	7
	OTHERS	12	16	5	0	6	3	42
	SUB TOTAL	30	46	24	5	7	6	118
OTHERS		38	22	1	1	0	1	63
TOTAL		105	115	31	11	18	13	293

SOURCE: MIDC

