4. 技術セミナー配布用レジュメ

Follow-up for Ex-participants of the Group Training Course in Post-Harvest Rice Processing, JICA, 1992

Recent Development in Rice Mills in Japan

February, 1992

Dr. Akira Hosokawa
Former Course Leader
Japan Grain Inspection Association

Recent Development in Rice Mills in Japan

1 The objectives of rice milling

The milling process is to convert rough rice into white rice. Modern rice mills usually perform a series of processes such as cleaning of rough rice, shelling, separation of rough rice from brown rice, removing of bran from brown rice, polishing of milled rice, sizing of brokens, mixing of rice to a given composition in terms of whole rice, large and small brokens, and packaging. Only very recent mills and their features will be discussed.

2 Terminology

Shelling : removal of hulls (glumes) or husks from harvested, dried rough rice or paddy. The result of shelling is brown rice regardless of the colour the shelled rice has. Also called hulling, husking, dehusking, etc.

Milling : removal of bran layers and germs from brown rice. Also refers to polishing, whitening, pearling.

Polishing : removal of traces of bran that may be sticking to the surface of the milled rice to give milled rice a smoother finish or glossy appearance. Sometimes called refining.

3 Brief history

Since Satake Engineering Company developed the Compass Rice Milling System in 1961, it became a kind of the standard mill in the rice milling industry in Japan as well as among modern rice mills in other countries. This system combined the advantages of abrasive and friction milling in one unit, with the horizontal abrasive first stage followed by one, two, or three horizontal friction stages. Especially popular is the milling system with two such units in series, each unit itself having two horizontal mills arranged vertically one above another. The first unit has a horizontal abrasive mill on the top as its first stage and a horizontal friction mill on the bottom as the second stage. The next unit consists of two horizontal friction mills which are arranged vertically. These two units constitute, in effect, a four-stage system. Both units are provided with jet air to blow bran away from rice and also to cool both the rice and the roll.

These units may be followed by one or two stages of polishers to give the milled rice a smoother and finer appearance.

Milling units are connected by bucket elevators to carry rice from unit to unit. They are compact, requiring less floor space than the previous systems of similar capacity used to occupy.

The Compass System improved milling recovery and milled rice quality. With added electronics gadgets and other minor improvements, the Compact System with horizontal type mills has captured in the past nearly 80 % or more of the large scale milling machine market in Japan.

4 Performance of Japanese milling machines

The mill in Japan is required to achieve the following.

a. Uniform removal of bran layers from rice grains keeping the original shape of starchy endosperm as it is. The milled rice should have proper glossy appearance.

b. The milling yield (outturn) in weight from brown rice should be 91 % or more.

c. The bran remaining on the surface of the milled rice should be less than 1 % in weight of the milled rice.

d. The contents of germ-retaining kernels should be less than 20 % in the milled rice.

e. The contents of brokens in the milled rice should be less than 12 %. (This means that the head yield should be 63.4 % or more. Usually the percentage of brokens is about 5 % when the head yield will be 68.4 %.)

f. Material losses should be less than 0.5 % in the milling process.

g. The milling rate should be 50 kg/hr/PS or more.

h. The temperature rise of rice during milling should not exceed 15 deg Centigrade in friction types and 25 deg Centigrade in abrasive types.

5 New milling machines

The decade of 1980's saw three new mills entering the Japanese market.

Yamamoto vertical mills called 'Super mill' in 1986,
Toyo ceramic milling machines called 'Ceramic Mill' in 1986,
Satake vertical mills called 'New Compass' in 1987.

Yamamoto and Satake machines are vertical but the flow of rice in the mill is just opposite. In Yamamoto mills rice flows downwards by gravity from top to bottom, whereas in Satake mills rice is pushed up from bottom to top. Toyo machines use for its first stage a roll with ceramic blades to scrape off bran layers

instead of a sintered abrasive roll.

6 Yamamoto vertical rice mills

Yamamoto company offers several models ranging in size from a small test mill with a 300 W motor and 30 kg/hr capacity to a 30 PS, 1.5 t/hr capacity mill. A milling system with two units of the latter in tandem has a capacity of up to 3.5 t/hr and a system with four units in tandem, up to 7 t/hr.

The main features the company claims are;

a. The milling roll is divided into two sections and is composed of tile-like milling pieces, which are either abrasive or frictional. Fig. 1. The abrasive piece is made of sintered grinding stone and the friction piece has a sharp edged projecting ridge. These pieces are interchangeable. The mill then can be made abrasive or frictional just as you choose. In the milling system, the upper section of the roll in the first unit may be abrasive, while the bottom section, frictional. The second unit may be simply frictional on both sections. This arrangement, in effect, realizes with one milling roll the same milling work as Satake Compass System where the top of the first unit is abrasive and the bottom is frictional. (Incidentally splitting the one horizontal roll into two and putting an abrasive roll near the feed hopper and a friction roll near the outlet is quite possible.)

b. Jet air stream is provided to cool rice and roll and to remove bran from rice.

c. The surrounding screen is hung by means of springs from the frame. The springs are provided to keep the milling pressure on the rice fairly constant. Fig. 2. They also take up sudden jerks which act on the rice and which may otherwise break the kernels. The springs can be tightened or loosened to adjust the milling pressure simply by turning a handle. The spring mechanism, however, complicates the machine structure, making it more expensive, and it might better be replaced by some other simpler method to achieve the same goal.

d. Because rice flows down the narrow hexagonal space between the centre roll (either abrasive or frictional) and the surrounding screen by gravity, the pressure distribution on the rice is uniform in radial direction, whereas along the roll axis, the pressure is greater near the entrance where big force is required to scrape off the hard bran, is much less in the middle part of the milling chamber where big friction among rice grains due to the rice surface whose bran is partly peeled off works milling effectively under a lower pressure, while near the outlet the pressure is a little raised so that the rice will be well polished. Fig. 3. Thus the company claims that the pressure

distribution along the milling chamber is ideal for milling.

e. After milling is over or when you want to mill a different variety, thorough cleaning of the milling chamber is needed. This vertical mill makes it a simple matter to discharge all the remaining grains by simply letting the bottom outlet wide open. The discharge of the remaining rice is almost instant.

5 Toyo ceramic mills. Fig. 4.

Toyo offers their ceramic mills in nine models which range in size from a 5 PS, 0.3 t/hr mill to a 125 PS, 6 t/hr mill.

a. Toyo uses an abrasive roll with ceramic blades for the first stage of their milling system. The company claims that their ceramic blades give tender and gentler scraping action to the bran layers, reducing the breakage of kernels in the subsequent milling, whereas violent cutting and scratching of the bran layers done by conventional sintered abrasive grinders will result in more brokens in the following friction milling.

b. A big 120 PS milling system is assembled in three tiers into one frame to form a compact unit. The ceramic mill makes the top tier, followed by the second stage horizontal friction mill in the second tier. The steel friction roll of the second stage is unique in that it has stretched V-shaped projecting ridges. The final stage is in the bottom tier and has two horizontal friction mills, one on the right and another on the left. Since rice flows down the unit, there is no mechanical conveyer connecting the stages. The installation of the milling system is achieved by simply placing the one compact unit on the floor and fixing it to the foundation. The floor space required for installation is also very small.

c. In the final stage, some special polishing fluid (the concoction of the fluid is a company secret, but you might use instead water or 60 % diluted sugar solution) is added to rice to give the milled rice a finer polish and finish.

6 Satake offers three large New Compass Systems; a 100 PS, 5 t/hr system, a 135 PS, 7 t/hr system and a 190 PS, 10 t/hr system.

a. The system consists in three vertical mills and a polisher. Fig. 5. The first stage is a vertical abrasive mill, followed by the second and third vertical friction mills. The polisher makes the fourth stage.

b. Satake claims that because rice is pushed up through the mill, the rice flows down from one mill to the next by gravity, thereby eliminating a connecting bucket elevator between two

stages.

c. A special pneumatic suction device is incorporated in the mill so that suction removes the remaining grains in the milling chamber mechanically, in case the milling chamber needs cleaning.

d. Once the ammeter of the second and the third mill is set at a desired current value, the mill run automatically to keep the milling load constant at the set ammeter reading.

e. In the third stage mist of liquid is sprayed to rice to assist polishing in that stage for better results.

7 Advantages of the vertical mill in which rice flows downwards

a. Vertical mills are nothing new. The mill with a rotating inverted or truncated abrasive cone has always been vertical. People say that the vertical abrasive mill works better for long rice and produces less breakage in milling than the horizontal abrasive or horizontal friction mill does.

b. The horizontal abrasive mill was first developed by Satake Engineering Company. (Satake, T.(1989). Modern Rice-milling Technology. Doctorate dissertation. English ed. p 261.) The main advantages of this type are that: 1) compact in size and construction, 2) the hard sintered abrasive roll cuts bran better and lasts longer. Even though the brake adjustment is provided for long rice (indica type varieties), still some millers prefer the inverted abrasive cone with emery coating for long rice to the horizontal abrasive mill.

c. Long rice is more susceptible to breakage under pressure than bold japonica rice which can take up considerable milling pressure without breakage. This seems the main reason why in milling long rice abrasive mills are preferred to friction mills where milling back pressure is usually much greater.

d. Downward movement of rice through the vertical milling chamber is shown schematically in Fig. 6. When the bottom shutter is open, the rice grain moves down the cylinder in vertical or perpendicular direction. (Here the direction means the direction of the long axis of the grain.) Fig. 6 (a). When the shutter is closed, incoming grains lie flat on top of another in the horizontal direction. Fig. 6(b). When the shutter is open again, the grains start motion all in vertical direction. Fig. 6(a). Therefore the cone peels off bran from the side of the kernel while the kernel rotates about its axis. Fig. 6(c). Thus the bran is removed by cutting or scraping action of the abrasive cone with little back pressure working on the rice.

e. Of course there are rubber brakes which help build a little pressure on rice and the pressure thus created mixes rice in the

milling chamber. Mixing of grains is necessary to help uniform bran removal from every part of the kernel surface and also help polish the rice among themselves.

f. The downward vertical movement of rice through the milling chamber seems to explain the main advantage of vertical abrasive mills and also justifies the use of abrasive mills for long rice. When rice is pushed up in the chamber, however, the grains may assume any direction, which seems to be rather ideal for friction milling. Tests are needed to see how pushing up works on long rice.

g. The only drawback of the abrasive type, whether vertical or horizontal, is that in milling parboiled rice the very sticky bran quickly fills up the surface pores of the grinder, making the surface of the cone or roll smooth. Thus the abrasive nature is lost from the cone or roll. The only way of avoiding this problem is to mill parboiled rice with a small degree of bran removal for each stage of a series of abrasive mills. Since the kernels of parboiled rice are very hard, the Engelburg type steel huller is still used with both an acceptable milling yield and the tolerable percentage of brokens.

h. My idea was to use vertical cutting edges instead of abrasive cones or rolls to scrape off the bran. The vertical mill, then, may work both raw rice and parboiled rice satisfactorily. If the mill is good for long rice, it must be good for short grains also. This idea was materialized by the engineers of Yamamoto Manufacturing Company into their Super Mills, At present their concern is more to mill bald domestic rice, but I am hoping that they will develop vertical mills which will solely be dedicated to long rice milling in the near future.

i. Professor S. Yoshizaki of Tsukuba University and one of his graduate students from the Philippines carried out the comparative studies between a small Super Mill and a cone type abrasive mill which was popular in the Philippines. The rice used were IR-98 and IR-60 varieties. They reported that the super mill used gave 3.2 - 8.2 higher milling yield than the conventional cone type mill did. (Vargas, Danile O., Takashi Satake, Sumihiko Miyahara and Shigeru Yoshizaki (1989). Characteristics of One-pass Vertical Friction-type Rice Whitener. Japanese Journal of Tropical Agriculture, 33(3):135 - 141.) The Japan Millers Association reported, however, that in their tests with joponica type rice, the Super Mill was only 0.5 % higher in milling recovery than the horizontal friction mill.

8 Performance of new mills

Table 1 summarizes the data of performance tests published by the Japan Millers Association. Rice varieties used are all of japonica type. Milling of rice was set to perform 20 % increase

in whiteness which corresponded to 10 % bran (and germs) removal or a recovery of 90 % milled rice. This target was almost met in all tests. All results are quite satisfactory, and fulfill the Japanese requirements given in Section 4.

With hard-to-mill rice, the percentage of germ-retaining kernels in the milled rice is lowered by either increasing the back milling pressure or extending milling time. Either method, however, will usually result in a higher percentage of brokens in the milled rice.

9 Other develpments

Recently a British Company reported their new rice sheller and a mill which were described in Grist's book. (Grist, D. H. (1986). Rice. Longman, London and New York, 6th ed. pp. 434 - 437). Also reported is that a US patent was granted to a new friction mill. (Luh, Bor S. (1991). Rice, vol. 1. AVI, 2nd ed. p.358.) It may be that in order to reduce rice milling losses, Europeans and Americans are also becoming more interested in developing new rice mills in the last few years.

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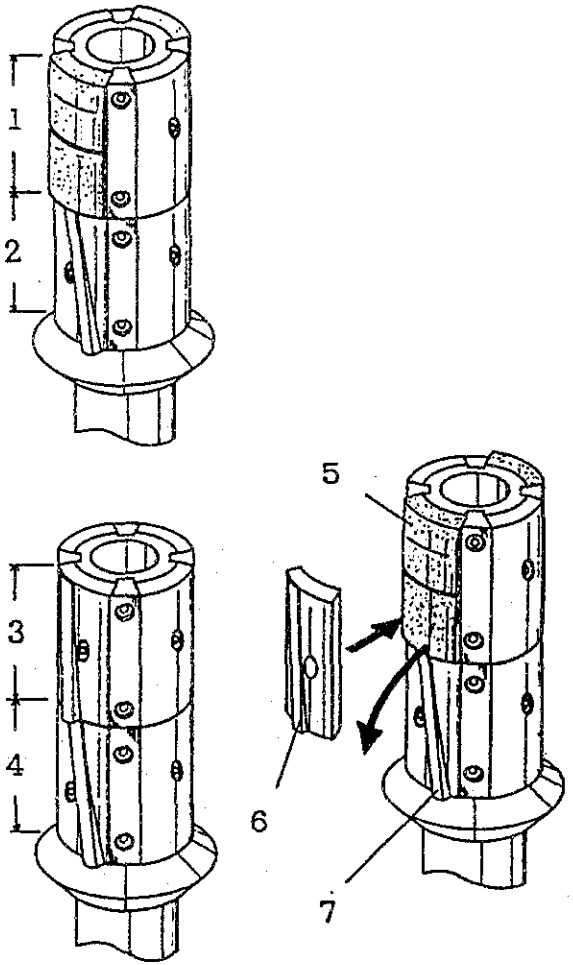

Fig. 1. Milling pieces
1,5:Abrasive piece.
2,3,4,6,7:Friction piece.

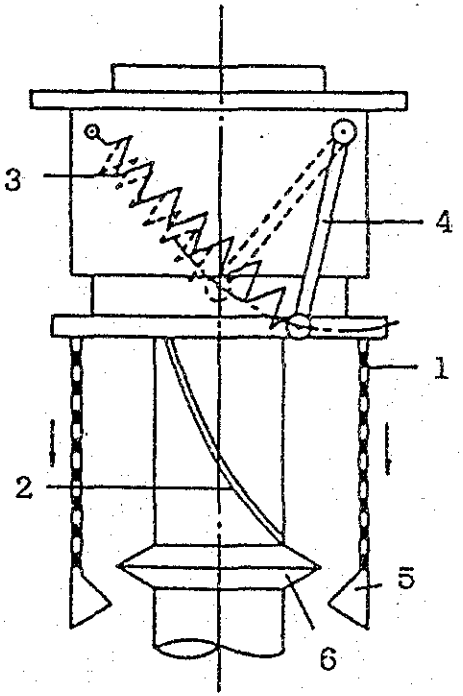

Fig. 2. Hexagonal screen
1:Screen. 2:Milling roll. 3:Spring.
4:Link. 5:Outer ring. 6:Inner ring.

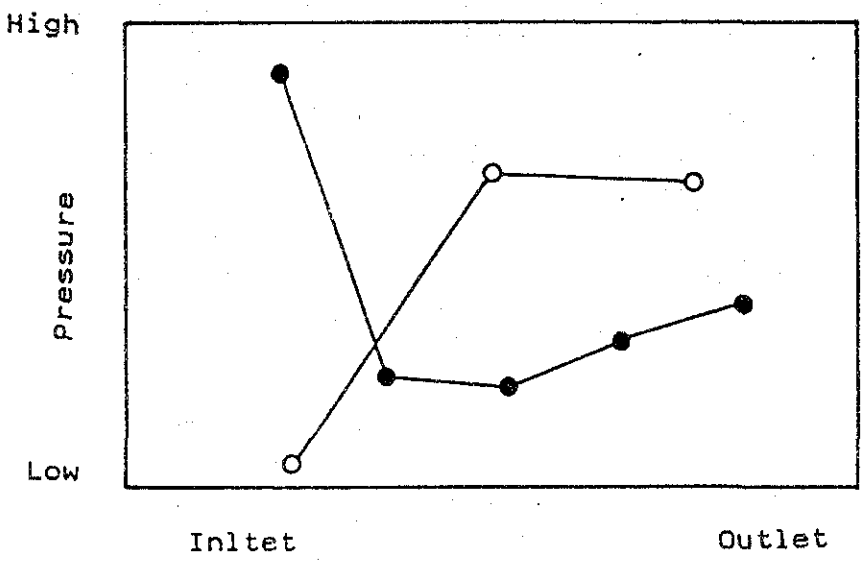

Fig. 3. Pressure distribution along the roll axis in the chamber
(Source:Prof. S.Yoshizaki, Tsukuba Univ.)

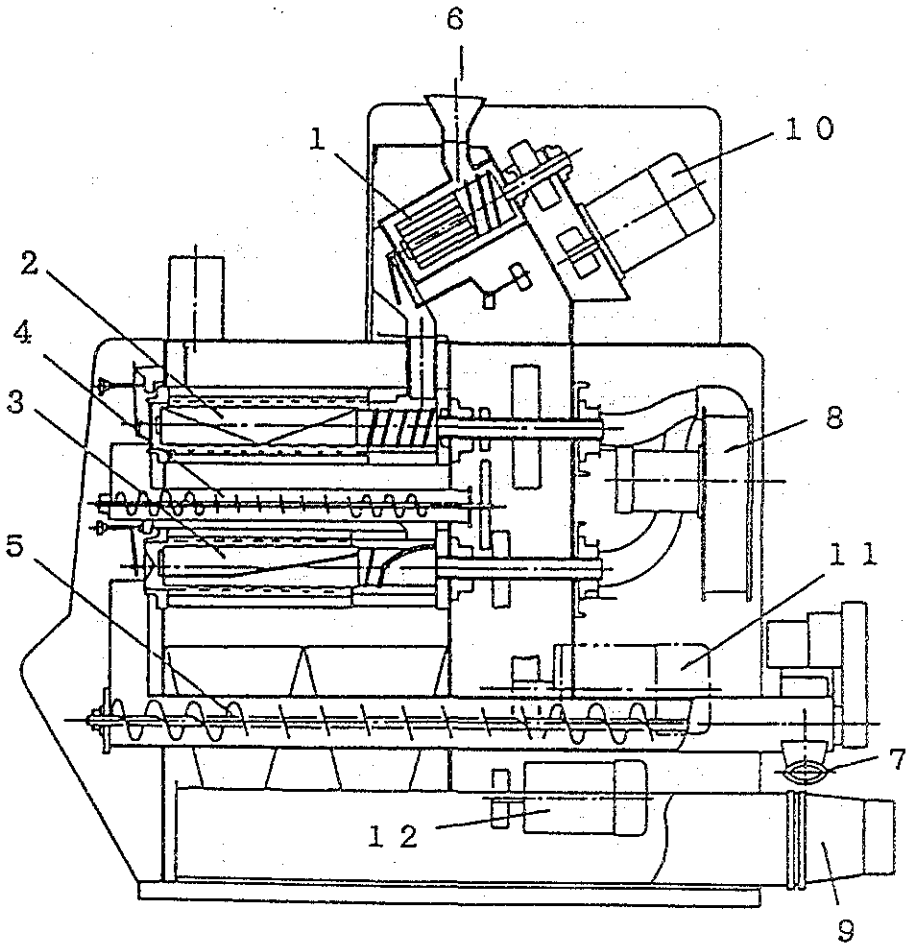

Fig. 4. Ceramin Mill (CS100AE)
1:Ceramic roll. 2:2nd stage friction roll.
3:3rd stage friction roll. 4,5:Screw conveyor.
6:Feed hopper. 7:Outlet. 8:Jet air blower.
9:Suction duct. 10:20 PS motor. 11:50 PS motor.
12: Two 20 PS 3rd stage motors.

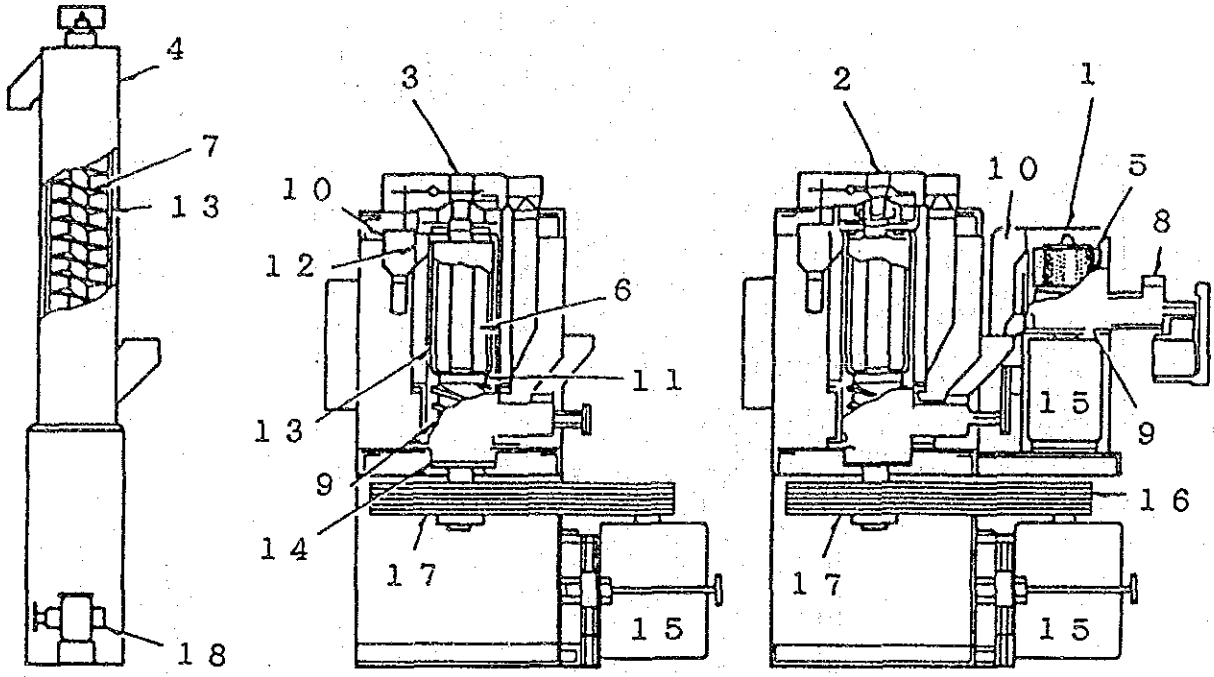

Fig. 5. New Compass (NCP 150)
1: First mill. 2:2nd mill. 3:3rd mill. 4:Polisher. 5:Abrasive roll. 6:Stirring roll. 7:Polishing roll. 8:Inlet. 9:screw roll. 10:Outlet. 11:Misting location. 12:Baffle. 13:Screen. 14:Main shaft. 15:Motor. 16:Motor pulley. 17:Main shaft pulley. 18:Outlet ratary valve.

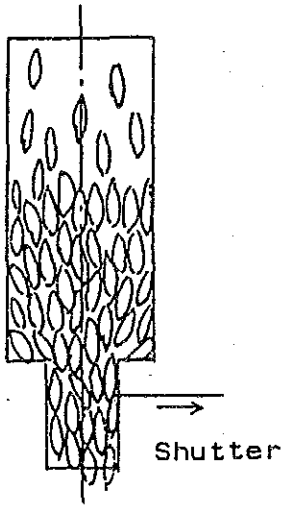

Fig. 6(a). Vertical grain flow through a cylinder.

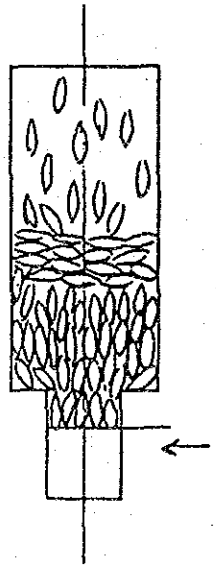

Fig. 6(b). When grain stopped.

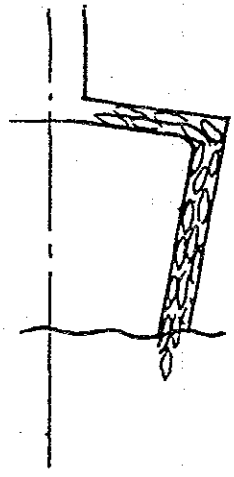

Fig. 6(c). Idealized grain flow through milling chamber.

Table 1. Performance of New Rice Mills

Maker	S A T A K E			T O Y O			Y A M A M O T O			
System	N C P - 1 5 0 A			C S 1 0 0 A E			R P - 2			
Stage and Component	1st : Abrasive (25 PS) 2nd : Friction (100 PS) 3rd : Friction (60 PS) 4th : Bran Cleaner (3 PS)			1st : Ceramic (25 PS) 2nd : Friction (50 PS) 3rd : Friction Left (20 PS) : Friction Right (20 PS)			1st : Abrasive + Friction (30 PS) 2nd : Friction + Friction (25 PS)			
Variety of Rice	Easy to Mill	Inter-mediate	Hard to Mill	Easy to Mill	Inter-mediate	Hard to Mill	Easy to Mill	Inter-mediate	Hard to Mill	Hard to Mill
Flow Rate (Capacity)	9.6 t/h	10.6 t/h	9.6 t/h	6.2 t/h	5.9 t/h	5.2 t/h	3.3 t/h	3.2 t/h	2.4 t/h	2.4 t/h
% Whiteness Increase	20.1 %	19.2 %	19.3 %	19.1 %	19.3 %	20.2 %	19.6 %	19.4 %	20.2 %	19.5 %
% of Germ Retention	8 %	14 %	24 %	9.5 %	12 %	12 %	12 %	5 %	9 %	11 %
Increment of Brokens	1.9 %	1.0 %	1.7 %	2.9 %	6.7 %	5.3 %	1.4 %	0.7 %	1.2 %	1.2 %
Turbidity in ppm	97	99	116	101	90	111	90	100	100	110

Source : Japan Millers Association, July, 1989.
Recovery rates were in the range of 90 +- 0.9 %.

5. 当該国訪問機関に提出した英文新見

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
P.O.BOX 216 MITSUI BLDG
2-1, NISHI-SHINJUKU, SHINJUKU-KU TOKYO
163 JAPAN

Cairo, February 7, 1992

Dear Sir

It is my great pleasure to submit the summary report of the Follow-up Team for Ex-participants of Post-harvest Rice Processing Course.

The Team, which was dispatched by the Japan International Cooperation Agency as part of its technical follow-up programme for the returned participants of Post-harvest Rice Processing Course and consists of three members as mentioned below, arrived in Arab Republic of Egypt on February 2nd 1992 and then continued its follow-up activities for the period of 4 days.

Through the visit of this time, we could obtain many valuable comments and suggestions about this Course from the competent authorities concerned and also from the ex-participants and other people around them. We are quite sure that the information we obtained should be greatly useful for the purpose of improving this training course and also technical cooperation programme.

Finally I would like to express my heartiest appreciation for your warm hospitality and kind cooperation extended to us during our stay in your country.

Yours faithfully.

Akira Hosokawa

Akira HOSOKAWA
Leader, Follow-up Team for Ex-participants
of Post-harvest Rice Processing Course

SUMMARY REPORT

The Technical Follow-Up Team for JICA Participants who attended Post-harvest Rice Processing Course

I. OBJECTIVES:

The Follow-Up Team visited Ex-participants, their organizations and related organs for the purpose of offering guidance through consultation, evaluating the results of training in Japan and needs in participants' countries as well as for improving JICA's training programme.

II. PERIOD:

From February 1st, 1992 to February 16th, 1992.

III. MEMBERS

1). Mr.Akira HOSOKAWA Ph.D. (Leader)
Ex-Course Leader of Group Training Course in Post-harvest Rice Processing,
Counsellor, Japan Grain Inspection Association
(Professor Emeritus, University of Tokyo)

2). Mr.Shunji NAKANO
Chief of International Cooperation,
Planning Division,
Food Agency

3). Mr.Yukiharu KOBAYASHI
Staff, Second Training Division,
Tokyo International Center,
Japan International Cooperation Agency

IV. SCHEDULE OF THE FOLLOW-UP TEAM

1. Feb. 2(Sun.) · Arrive Cairo

2. Feb. 3(Mon.) · Coutesy Call to the Embassy of Japan
· Visit to JICA Office for arrengement of the schedule
· Courtesy Call to Ministry of Foreign Affairs
· Courtesy Call to Ministry of Supply
· Move to Alexandria by car

3. Feb. 4(Tue.) · Visit to Rice Technology Training Centre
- Meeting with Ex-participants
· Seminar on Recent Development in Rice Mills in Japan
· Friendship Party hosted by the Term

4. Feb. 5(Wed.) · Visit to Rice Research & Training Center
· Visit to Rice Mechenization Center
- Meeting with Ex-participant

5. Feb. 6(Thu.) · Visit to Agricultural Research Center
· Visit to Agricultural Mechanization Reseach Institute
· Report to JICA Office and the Embassy of Japan

6. Feb. 7(Fri.) · Day off

7. Feb. 8(Sat.) · Leave Cairo for Dar-Es-Salaam

V. EGYPTIAN PERSONNEL WITH WHOM THE TEAM MET

1. Ministry of Foreign Affairs

Mr. Nabil Badel
Ambassador, Director of Cultural & Technical Cooperation Dept.

2. Ministry of Supply

Mr. Hassan Khedr
Chairman, Rice Milling & Marketing Co.

3. Rice Technology Training Centre

Mr. Ahmed Amin El Morsy
Head, Sector of R.T.T.C.

4. Agricultural Research Center

Dr. Balal
Director, Rice Research & Development Program

5. Agricultural Mechanization Research Institute

Dr. Sahrigi
Director

6. Rice Mechnazation Center

Mr. Osama Kamel
Director

VI. EX-PARTICIPANTS WITH WHOM THE TEAM MET (Egypt)

YEAR OF TRAINING	NAME	PRESENT POST
1980	Mr.Osman Abd El Fatah Sharawy,	Chief Operation, R.T.T.C.
1983	Mr.Mohamed Ibrahim El Saaid,	Director of Rice Mill, R.T.T.C.
1982	Mr.Mahmoud Mahmoud El Siginy,	Head of Dept.of Laboratory, R.T.T.C.
1990	Mr.Medhat Abd El Moneim Dalil,	2nd Laboratory Specialist, R.T.T.C.
1981	Mr.Hatem Rashed Aref,	Chief Production, R.T.T.C.
1984	Mr.Fayez Mohamed Abd Allah,	2nd Laboratory Specialist, R.T.T.C.
1980	Dr.Ahmed Abd El-Kader El-Hissewy,	Senior Researcher, R.R.T.C.
1985	Mr.Mohamed Fakhry Ahmed Fares,	General Manager, R.T.T.C.
1977	Mr.Ahmed Abd El-Aziz Amer,	(Retired)
1986	Mr.Mostafa Ahmed Mohamed Shehata,	Chief Production of the Japanese Rice Mill, R.T.T.C.
1988	Mr.Hany Mofid Abou El Khier,	Manager for planning and training courses, R.T.T.C.
1977	Mr.Maher Mohammad Mohammad Awad,	General Manager, Alexandria Rice Mills Co.
1991	Mr.Mohamed Okasha,	Technical Incharge, R.M.C.

Ⅶ. SUMMARY OF FINDINGS

Among 15(fifteen) ex-participants, the Team could meet with the (13) of them and also cooperated with the Team in answering the Questionnaire, which JICA had distributed in advance.

Through the meeting with the ex-participants and officers of the related organizations, the Team could obtain their proposals for improving the Course and requests for follow-up services on the Course.

(1) Suggestions and opinions obtained all through the activities of the Team in Egypt for improving the Course as follows:

a) Objectives on General Information

We found that these objectives have completely accomodated the requirement in the field of post-harvest rice processing in Egypt

b) Identification of Technical Problems in Egypt

- Not enough facilities to reduce acidity
- Red Grains
- Mud Balls
- Law quality of raw materials (high moisture in paddy)
- Storage facilities (loss in Bare Storage)
- Broken grains from cracks

We found that we should add such subjects that the above-mentioned problems were expected to be solved.

c) Following subjects were found to be useful

1). Lectures

- rice milling process
- rice storage
- parboiling rice
- rice milling machinery

- rice bran oil manufacturing
- paddy & brown rice drying
- small scale rice whitening machine
- rice inspection system
- analysis of rice & measurement procedure

2). Practical training

- assembling & disassembling of rice whitening machine & dryer
- design example of rice milling plant

We found that the above-mentioned subjects should be in the Course continuously.

d) Balance of Time Allocation

We found that more practical training should be added in the following items.

- rice drying & storage
- rice milling
- rice inspection

(2) Suggestions and opinions as to the follow-up activities are as follows:

a) More literatures and technical information to follow
b) Retraining or refresher training were required in the following items.
   - drying & storage
   - by-products utilization
   - advanced course on laboratory equipment & inspection

Ⅷ. THE IMPRESSION OF THE TEAM

The impression the Team received through the visits to the organizations concerned and discussions with the ex-participants and their superiors is as follows:

Through the activities in Egypt, we have received many suggestions and comments from ex-participants. Taking their valuable opinions into consideration, we would like to make further efforts to improve Post-harvest Rice Processing Course.

Since the majority of younger ex-participants were from RTTC, they could establish, assisted by JICA grants, the so-called Japanese method of milling together with grading and testing of milling quality in RTTC. The method has been well accepted and practised by all mills which are under the Ministry of Supply through the training given by RTTC to the mill workers. Thus, both the milling yield and head yield in their milling plants rose almost to a possible maximum. As these mills process, one third of rice harvested in Egypt, their contribution to national rice supply seems significant. This is one success story of the training course and the JICA grants. Accordingly, their requests and comments were very specific, centered around the milling facilities supplied by JICA.

An ex-participant from RRTC(Rice Research Training Center), voiced a comment, however, that the training gave him the concept of milling yield and palatability, and that these two concepts led him to the establishment of a milling laboratory and a quality laboratory under his breeding section. His line of breeding, he said, must always satisfy high-milling outturn and at the same time, consumers' taste. This is another success story of the training course.

These two objectives of the training course have always been and

will always be somewhat contradictory and always need comprise between two. The training course has intended to be general, targeted especially at training of middle level administers and engineers working in national rice supply and improvement of rice milling methods in respective countries by giving them the examples currently practised in Japan through the course.

With this view in mind, the distribution of General Information may be diversified so that the selection of participants be further extended to other sections of agriculture which deal with rice in general, on the other hand, the specific requests and opinions on the practical side of training which were expressed to the follow-up team should be rightly reflected in the future organization and modification of the group training course on post-harvest rice processing on the other.

In addition, we are impressed by the fact that ex-participants are occupying important positions in their services and have been in their senior posts, carrying out prominent work in their respective organizations. They were very cooperative to the team and we are very grateful .

Finally we would like to express our heartfelt gratitude to all respective authorities concerned and our dear ex-participants, and especially to Mr.Morsy and the staff of RTTC members of the organizing committee of the Seminar for their cooperation, assistance and hospitalities. We could not have carried out this work in the short time given to us if it had not been for tremendous help rendered by those attendances.

Thank you very much.

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
P.O.BOX 216 MITSUI BLDG
2-1,NISHI-SHINJUKU,SHINJUKU-KU TOKYO
163 JAPAN

Dar-es-Salaam, February 13, 1992

Dear Sir

It is my great pleasure to submit the summary report of the Follow-up Team for Ex-participants of Post-harvest Rice Processing Course.

The Team, which was dispatched by the Japan International Cooperation Agency as part of its technical follow-up programme for the returned participants of Post-harvest Rice Processing Course and consists of three members as mentioned below, arrived in United Republic of Tanzania on February 9th 1992 and then continued its follow-up activities for the period of 4days.

Through the visit of this time, we could obtain many valuable comments and suggestions about this Course from the competent authorities concerned and also from the ex-participants and other people around them. We are quite sure that the information we obtained should be greatly useful for the purpose of improving this training course and also technical cooperation programme.

Finally I would like to express my heartiest appreciation for your warm hospitality and kind cooperation extended to us during our stay in your country.

Yours faithfully.

Akira Hosokawa

Akira HOSOKAWA
Leader, Follow-up Team for Ex-participants
of Post-harvest Rice Processing Course

SUMMARY REPORT

The Technical Follow-Up Team for JICA Participants who attended Post-harvest Rice Processing Course

I. OBJECTIVES:

The Follow-Up Team visited Ex-participants, their organizations and related organs for the purpose of offering guidance through consultation, evaluating the results of training in Japan and needs in participants' countries as well as for improving JICA's training programme.

II. PERIOD:

From February 1st, 1992 to February 16th, 1992.

III. MEMBERS

1). Mr. Akira HOSOKAWA Ph.D. (Leader)
Ex-Course Leader of Group Training Course in Post-harvest Rice Processing,
Counsellor, Japan Grain Inspection Association
(Professor Emeritus, University of Tokyo)

2). Mr. Shunji NAKANO
Chief of International Cooperation,
Planning Division,
Food Agency

3). Mr. Yukiharu KOBAYASHI
Staff, Second Training Division,
Tokyo International Center,
Japan International Cooperation Agency

IV. SCHEDULE OF THE FOLLOW-UP TEAM

1. Feb. 9(Sun.) · Arrive Dar-es-Salaam

2. Feb.10(Mon.) · Visit to JICA Office for arragement of the schedule
· Courtesy Call on Ministry of Foreign Affairs
· Courtesy Call on the Embassy of Japan

3. Feb.11(Tue.) · Visit to National Milling Corporation
· Visit to National Agricultural and Food Corporation
- Meeting with Ex-participants
· Visit to Tanzania Prisons (Correctional Institution)
- Meeting with Ex-participants

4. Feb.12(Wed.) · Seminar on Recent Development in Rice Mills in Japan
· Friendship hosted by the Term

5. Feb.13(Thu.) · Report to JICA Office and the Embassy of Japan
· Courtesy Call to Ministry of Agriculture & Livestock Development
· Leave Dar-Es-Salaam for Tokyo

V. TANZANIAN PERSONNEL WITH WHOM THE TEAM MET

1. Ministry of Foreign Affairs

Mr. Mwaikanbo
Acting Head of Asia and Australasia

Mr. Nkurlu
Foreign Service Officer

2. National Milling Corporation

Ms. J.R.Gondwe
Acting Personnel and Administration Manager

Mr. M.S.Mohamed
Branch Manager

Mr. S.Kilakala
Mill Manager

3. National Agricultural and Food Corporation

Mr. Remi M.Linjewile
General Manager

Mr. S.O.Pume
Manpower Development & Administrative Manager

Ms. Margaret Manyanda
Manpower Planning & Training Officer

Mr. J.A.Kamulika
Senior Manpower Planning & Training Officer

4. Tanzania Prisons

Mr. S.A.Mwanguku
Principal Commissioner of Prisons

Mr. S.F.Lupala
Senior Assistant Commissioner of Prisons

Ms. R.B.Thomas
Senior Assistant Commissioner of Prisons

Mr. F.M.Lumuva
Assist Inspector

Mr. O.E.Malisa
Senior Assistant Commissioner of Prisons

Mr. N.Nyaluchi
Senior Superintendent of Prisons, Deputy Commandant of Prisons
Staff College

Mr. J.E.Nusurupia
Senior Assistant Commissioner of Prisons

Mr. H.A.Makule
Assistant Commissioner of Prisons

Mr. John C.Minja
Senior Superintendent of Prisons

Mr. R.A.Mwakijale
Senior Assistant Commissioner of Prisons

5. Ministry of Agriculture & Livestock Development

Dr. Majuua

Actiry Commissioncufor Agriculture& Civestock Development

VI. EX-PARTICIPANTS WITH WHOM THE TEAM MET (Tanzania)

YEAR OF TRAINING	NAME	PRESENT POST
1987	Mr. Samuel Hassani Shetui	Operations Officer I, National Agricultural and Food Corporation
1990	Mr. Francis Mabula Mpangalala	Field Officer Grade One, National Agricultural and Food Corporation
1988	Mr. Ramadhan Salim Mvulle	Farm Manager & Senior Superintendent of Prisons, Agricultural Division, Tanzania Prisons
1983	Mr. Issa Ali Issa	Regional Extention Officer, Ministry of Agricuture, Livestock & Natural Resourse, Zanzibar
1991	Mr. Hamad M.Hamad	Mechanical Engineer, Rice Development Project, Ministry of Agriculture, Livestock & Natural Resourse, Zanzibar

Ⅶ. SUMMARY OF FINDINGS

Among 13(Thirteen) ex-participants, the Team could meet with (5) of them and also be cooperated with the Team in answering the Questionnaire(6), which JICA had distributed in advance.

Through the meeting with and the Questionnaire of the ex-participants and officers of the related organizations, the Team could obtain their proposals for improving the Course and requests for follow-up services on the Course.

(1) Suggestions and opinions obtained all through the activities of the Team in Tanzania for improving the Course as follows:

a) Objectives on General Information

We found that these objectives have completely accomodated the requirement in the field of post-harvest rice processing in Tanzania.

b) Identification of Technical Problems in Tanzania

- rice is harvested too late → loss high
- no grades of rice
- poor storage → loss of grains
- some people not cooperative to take new ideas when extension (conservativeness)
- lack of machineries for post-harvesting

We found that we should add such subjects to the Training Culliculum that the above- mentioned problems were expected to be solved. Especially, we found that we should add subjects which will let participants think out the appropriate technology in Tanzania.

c) Following subjects were found to be useful

1). Lectures

- drying and dryers
- whitening machines and polished rice
- colour sorter
- rice master machines
- rice milling

2). Practical training

- practical training in Satake & Yamamoto

We found that the above-mentioned subjects should be in the Course continuously.

d) Requests to improve the training curriculum

We found that the following subjects should be added in accordance with the needs of ex-participants and related organizations

- maintenance of rice mills & related technical aspects
- management of post-harvest rice processing
- more time on practical training in drying & milling
- disease control during processing

(2) Suggestions and opinions as to the follow-up activities are as follows:

a) More literatures and technical information to follow

b) Retraining or refresher training were required in the following items.

- rice drying & dryers
- rice milling for appropriate technology
- seeds processing technology
- quality control & inspection of rice

Ⅷ. THE IMPRESSION OF THE TEAM

The impression the Team received through the visits to the organizations concerned and discussions with the ex-participants and their superiors is as follows:

1. Improvement of the training course

Through the activities in Tanzania, we have received many suggestions and comments from ex-participants. Taking their valuable opinions into consideration, we would like to make further efforts to improve Post-harvest Rice Processing Course.

2. Results of Training & Identification of needs for the training course

We are impressed by the fact that ex-participants are occupying important positions in their services and have been in their senior posts, carrying out prominent work in their respective organizations. They were very cooperative to the team and we are very grateful . Especially, all the section chiefs whom we visited expressed their desire that the training course of Post-harvest Rice Processing be continued for further training of their staff. They said the trainees, once coming back, showed eagerness, alertness and willingness to job with pride. This, they said, is the remarkable result of training in Japan.

3. *Distribution of General Information on the training course*

Most of the ex-participants were from National Agricultural and Food Corporation, only one being from National Milling Corporation and another from a Prison Farm. NMC processes 60% of rice produced here and the Prison Farm, with its large size, feeds the inmates in rice and maize it produces. Delivery of the General Information of the Course, therfore may be diversified in the future so that the Government of Tanzania can select eligible candidates from a wider range of sections and offices dealing with rice production and rice processing.

4. Rice Processing in Tanzania and the future

We were told that 40% of rice was milled by village mills using crude machines and that their recovery rate of white rice from rough rice was 49% ～ 50%. On the other hand, the JICA rice mill in Kilimanjaro project is milling rice with 65%～68% milling yield. With better machines and improved systems, 15% ～ 18% more rice for human consumption can be easily obtained without the increase of rice production. The role of post-harvest rice processing technology is so significant in this country that the neccesity of further training of personnel and of the introduction of proper milling technology is keenly felt by this Follow-Up Team.

Finally we would like to express our heartfelt gratitude to all the ex-participants and the personnels of authorities concerned, and to the attendants of the Seminar for their cooperation, assistance and hospitalities. We could not have carried out this work in the short time given to us if it had not been for tremendous help rendered by those attendances.

Thank you very much.

6. 持ち帰り資料

1. RRTC, Sakha, Egypt (1988). Sixth National Rice Research Conference Proceedings, March 26 - 28, 1988.

2. General Information, Rice Mechanization Center, Sept. 1988, JICA.

3. General Information, Agtricultural Mechanization Research Institute, Egypt, 1988.

4. General Information, Rice Technology Training Centre, Alexandria, Egypt, 1985.

5. Highlights of Recent Rice Research in Egypt, 1981 - 1985. Ministry of Agriculture and Land Reclamation, Arab Republic of Egypt.

6. Mohamed S. Balal (1991). Significant Results of IRRI - INGER in Egypt. 1990 - 1991 Report. Rice Research and Development Program, Agricultural Research Center, Giza, Egypt.

7. The Parboiling of Paddy, Why and How. RTTC, Alexandria, Egypt.

8. Activities of Rice Technology Training Centre. General information of the centre on various activities.

9. Applied Reseachg Activities at RTTC. Description of the areas covered by RTTC.

10. Training Activity at RTTC. Summary of training courses given between 1981 - 1991.

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