Chapter 8

Industrial Standard for Recycled Goods in Japan and South East Asian Countries

Michikazu Kojima
Environment and Natural Resource Studies Group-Interdisciplinary Studies Center, IDE-JETRO

Vella Atienza
Environment and Natural Resource Studies Group-Interdisciplinary Studies Center, IDE-JETRO

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CHAPTER 8

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Michikazu KOJIMA and Vella ATIENZA

1. Introduction

To promote market transaction of recyclable waste, recycled material and recycled goods, various standards have been developed. This chapter reviews the current standards for promoting recycling, especially in industrial standard for recycled goods in Japan and South East Asian Countries. In Section I, the roles of industrial standards for promoting recycling are explained. Section II presents some types of standards related to recycling. Section III reviews the industrial standards for recycled goods. In Section IV, the necessity of action plan to identify the priority of standard development for promoting recycling is emphasized.

2. Roles of Standards for Promoting Recycling

Every stakeholder can make their own quality requirement for input and output. But if there are various standards for the same type of recyclable waste, recycled material and recycled goods, transaction cost between stakeholders becomes expensive. Development of a common standard based on the existing different input and output requirement can help to reduce this cost and can make the operation easier and more efficient.

As mentioned in the previous chapter, standards are developed to assure the quality of goods in the market. In recycling, many stakeholders such as waste generator, recyclable waste collector, intermediate processor, material recycler, producer using recycled material are involved.

The transaction among these stakeholders can become smoother, if standard is provided. For example, the classification of used paper is used as a standard for paper recycling. There are various types of paper (Table 1). If various types of used paper are mixed, it is difficult to produce high quality paper. Used carton paper should be collected separately from other used paper, with some allowable level of mixture of other waste to produce carton paper. The presence of

impurities also degrades the quality of paper and causes trouble in processing and production control, which include damage of production facility, increase burden for cleaning, poor appearance of paper and odor adherence to paper.

Oftentimes, consumers hesitate to purchase recycled goods because the quality of recycled goods are not ensured. Thus, the quality standard for recycled goods, with standardization of testing, can make consumers confident in the quality of recycled goods. Standard is also a basis for a smooth market transaction especially among countries. Therefore, to promote international recycling various standards should be developed.

Table 1 Group and Major Grades of Recovered Paper

Group	Major Grade
Hard white shavings; cards	White shavings
	Cream shavings
	Ruled-paper shavings
White woody shavings; white manila	High-grade white wood-containing shavings
	White wood-containing shavings
Fine printed paper	White ledger
	Color ledger
	Wood-free shavings with partial color print
	Coated white shavings
	Polycoated milk carton stock
	Sorted office paper
Woody printed paper	High-grade color-printed wood-containing shavings
	Color-printed wood-containing shavings
	High-grade wood-containing waste
Old newsprint	Old newsprint
Old magazines	Old magazines
Kraft browns	New brown kraft cuttings, unprinted brown kraft
	Used brown kraft sacks
	Kraft lined corrugated container

Old corrugated containers	Corrugated container
	New double-lined kraft corrugated cuttings
Boxboard cuttings	Mill wrapper
	White paperboard cuttings
	Chipboard cuttings (Carton)
	Sorted residential old paper and paperboard

Note: The table is based on the revision in September 2009. Original version was made in March, 1979.

Source: Paper Recycling Promotion Center, "Paper Recycling in Japan," April, 2009. <http://www.prpc.or.jp/menu05/pdf/english-paperrecycling.pdf > (accessed 30 March 2010).

3. Types of Standards for Promoting Recycling

3.1. National Standard and Industry's Voluntary Standard

Standards are made by national standardization organization and industry association. National standard is authorized by governmental agency. Government research institution and industry association organize committees to make a draft of national standard. Draft national report is usually scrutinized by experts, industries and other stakeholders. Based on comments from other stakeholders, draft national standard was amended and approved by government organization.

On the other hand, associations of industries often make their own standard, without approval from governmental organization. Standard developed by associations of industries are basically a voluntary standard.

3.2. Mandatory and Voluntary Standard

National standard can be mandatory or voluntary standard. Mandatory standards should be satisfied by all the concerned products in the market. If not, goods cannot be sold in the country. Voluntary standard is used by producer and consumer in voluntary basis. Producer and consumer are free to sell and buy products which are not satisfying the voluntary standard.

3.3. Import and Export Standard

Recyclable waste, recycled material and recycled goods are not only traded in a country, but also traded internationally. Some countries impose some trade restriction on recyclable waste. Major background of the trade restriction is environmental concerns. Non-recyclable waste may be imported under the name of recyclable waste. Recyclable waste with hazardous substances may cause pollution problem. To prevent negative impact of these said scenarios, trade restrictions such as import ban and prior notice and consent have been introduced by some countries.

To implement the regulation effectively, the standard to clarify regulated material and freely traded material should be developed. Some countries developed the standard for imported and exported recyclable waste.

3.4. Eco-labeling

Eco-labeling is labeling to distinguish environmentally friendly products from other goods. The types of eco-labeling are defined in the International Organization for Standardization (ISO). Type I of Eco-label is defined in ISO 14024, which can be used with certification of third party and satisfaction of multiple criteria, including use of recycled materials. Type II of Eco-label is defined in ISO 14021, which is informative environmental self-declaration claims. Type III is

defined in ISO 14025, which is information disclosure of quantified environmental data based on life cycle assessment (LCA).

Some East and Southeast Asian countries introduce eco-labeling scheme, in which recycling is a part of criteria. For example, the Standards and Industrial Research Institute of Malaysia (SIRIM), an organization to support standard development in Malaysia, issues criteria for eco-labeling such as Recycled Rubber Products, Paper-based Packaging Products and Recycled Plastics Products.

4. Industrial Standards for Recycled Goods in Japan and Southeast Asian Countries

Japan and South East Asian countries have established some industrial standards for recycled goods in the national standards. This section shows the initial survey on the industrial standards for recycled goods in Japan and selected Southeast Asian Countries. The lists of industrial standards are compiled, based on the internet search of websites of standardization body in each country. It should be noted that further investigation is needed to verify the content of each standard to identify the characteristics of each standard.

It can be observed that some items are also listed in international standardization body, such as ISO and the International Electrotechnical Commission (IEC).

4.1. Japan

According to data submitted to Environment and Resource Circulation Committee in Industrial Structure Council, 83 standards have been established until 2006. Some standard deals recycled products and goods made from virgin resources together.

Table 2 Selected Japan Industrial Standards (JIS) for Promoting Recycling

JIS Number	Name of Standard	Content
JIS A5021	Melt-solidified slag aggregate for concrete derived from municipal solid waste and sewage sludge	Quality standard and maximum leachate level
JIS H2109	Classification standard of copper and copper alloy scraps	Classification
JIS R5214	Ecocement	Cement made from ash generated in municipal solid waste generator
JIS K6999	Plastics – Generic identification and marking of plastics products	Mark for plastic products to identify the type of plastics.
JIS P8231	Recycled pulp – Estimation of stickies and plastics – Image analysis method	Identify stikies and plastics in recovered pulp.
JIS Z7302-1	Densified refuse derived fuel (RDF)– Part 1 General principles of testing method	General principles of testing methods for RDF

Source: Compiled from various sources.

4.2. Philippines

Bureau of Product Standards (BPS) is a governmental agency under the Department of Trade and Industry (DTI), established by Republic Act No. 4109 (Philippine Standardization Law) and Executive Order No. 133. As the National Standards Body, BPS is mandated to develop, implement, and coordinate standardization activities in the Philippines. It is primarily involved in standards development, product certification, and standards implementation and promotion to raise the quality and global competitiveness of Philippine products at the same time to protect the

interests of consumers and businesses (BPS-DTI 2009). Philippine National Standard (PNS) is the name of national standard in the Philippines.

Table 3 Philippine National Standard for Promoting Recycling

Standard Designation Number	Title
PNS IEC 60335-2-104:2006	Safety of household and similar electrical appliances - Part 2-104: Particular requirements for appliances to recover and/or recycle refrigerant from air conditioning and refrigeration equipment
PNS ISO 15360-2:2002	Recycled pulps - Estimation of stickies and plastics -Part 2: Image analysis method
PNS 1269:1995	Pin adhesion test of corrugated fibreboard
PNS ISO 12460-4:2009	Wood-based panels - Determination of formaldehyde release - Part 4: Desiccator method
PNS 1894:1999	Particle boards - Definition and classification
PNS 230:1989	Particle boards - Specification
PNS ISO 9425:0000	Wood-based panels - Determination of moisture content
PNS ISO 9426-1:0000	Wood-based panels -Determination of dimensions - Part 1: Determination of thickness, width and length
PNS 63:2006	Blended hydraulic cement with pozzolan - Specification
PNS 69:2005	Blended hydraulic cement with slag - Specification
PNS 115:1987	Fly ash for use in concrete - Specification
PNS 749:1992	Cement - Fly ash or natural pozzolan for use as a mineral admixture in Portland cement concrete - Sampling and method of test
PNS ASTM A 593:2004	Standard specification for fly ash and other pozzolans for use with lime

PNS ASTM A 618:2004	Standard specification for coal fly ash and raw or calcinated natural pozzolan for use as a mineral admixture in concrete
PNS ASTM C 618:2003	Standard specification for coal fly ash and raw or calcined natural pozzolan for use as a mineral admixture in concrete
PNS ASTM C 618:2004	Standard specification for coal fly ash and raw or calcined natural pozzolan for use in concrete
PNS 211:2000	Rerolled steel bars for concrete reinforcement - Specification
PNS 211:2002	Rerolled steel bars for concrete reinforcement - Specification
PNS 555:1991	Retreading pneumatic tires - Specification
PNS 1065:2006	Compounded rubber for retread and repair - Specification
PNS ISO 11650:2005	Performance of refrigerant recovery and/or recycling
PNS 73:1997	Paper, board and pulps - Toilet tissue paper - Specification

Source: Bureau of Product Standards- Department of Trade and Industry (BPS-DTI). 2009. "Philippine National Standard (PNS) Catalog." <http://www.bps.dti.gov.ph> (accessed 28 October 2009).

Philippines utilizes the American Society for Testing and Materials (ASTM) standards in addition to ISO standards.

4.3. Vietnam

Directorate for Standards, Metrology and Quality (STAMEQ) is the national standards body of Vietnam. It is attached to the Ministry of Science and Technology, which performs the function of State management over standardization, metrology as well as product and goods quality according to law provisions (STAMEQ 2009). Vietnamese National Standards (TCVN) is the name of standard.

Table 4. Vietnam National Standard for Promoting Recycling

TCVN number	Title
TCVN 4316 2007	Portland blast furnace slag cement
TCVN 4315 2007	Granulated blast furnace slag for cement production
TCVN 4033 1995	Portland puzzolan cement – Technical requirements
TCVN 6260 1997	Combined portland cement
TCVN 6882 2001	Mineral admixture for cement
TCXDVN 395:2007	Mineral admixtures for roller-compacted concrete
T4 TCN 114 2001	Cement and additives in irrigational construction.
TCVN 7712 2007	Low heat blended portland cement
TCVN 7711 2007	Sulfate resistance blended portland cement
TCVN 5946 2007	Waste paper
TCVN 7342 2004	Carbon steel scrap used as charge material for ordinary carbon steel making – classification and technical requirements

Source: Vietnam TCVN Brochures.

4.4. Thailand

Thai Industrial Standards Institute (TISI) was established in the Ministry of Industry as the national standards body of Thailand. It is tasked to develop national standards and monitor quality of products and services in accordance with the requirements and international practices, to develop community product standards and provide certification service, to promote and develop national standardization activities, to cooperate with foreign standardization organizations both bilateral and multilateral levels, and to provide information on standardization (TISI 2009). Thai Commodity Product Standard (TCPS) is the name of the national standard.

Table 5. Thai Commodity Product Standard for Promoting Recycling

TCPS Number	Title
809/2548	Recycled paper
627/2547	Ash glazed porcelain
441/2547	Coconut fibre broom
782/2548	Coconut fibre mattress
77/2546	Corn husk doll
433/2547	Corn husk paper
437/2547	Corn husk paper products
229/2547	Elephant dung paper
230/2547	Elephant dung paper products
440/2547	Palm fibre broom
186/2546	Palm fibre products
411/2547	Palm fruit shell products
428/2547	Paper-mache products
650/2547	Products made from recycled paper
581/2547	Products made from recycled paper coated with resin
636/2547	Products made from used spare parts
823/2548	Products made from waste

Source: Thai Industrial Standards Institute (TISI). 2009. "Thai Community Product Standards," <http://www.library.tisi.go.th> (accessed 30 October 2009).

4.5. Malaysia

Standards and Industrial Research Institute of Malaysia (SIRIM) is a wholly-owned company of the Malaysian Government under the Minister of Finance Incorporated. It was registered on 15 November 1995, and in full operation as a corporate entity on 1 September 1996.

Since then, it has successfully delivered its role as the national agency for industrial development (SIRIM Berhad 2009). Malaysian Standards (MS) is the name of national standards in Malaysia.

Table 6. Malaysian Standards for Promoting Recycling

MS Number	Title
MS ISO 22628:2009	Road Vehicles – Recyclability and Recoverability – Calculation Method
MS 2080:2008	Ecolabeling Criteria for Recycled Papper
MS 1904:2006	Specification for Polyethylene Plastics Moulding and Extrusion Materials from Recycled Post –Consumer (HDPE) Sources
MS 1388 : 1995	Specification for High Slag Blastfurnace Cement
MS 1389 : 1995	Specification for Portland Blastfurnace Cement
MS 1387 : 1995	Specification for Ground Granulated Blastfurnace Slag for Use with Portland Cement
MS ISO 3037:2008	Corrugated Fiberboard – Determination of Edgewise Crush Resistance (Unwaxed Edge Method)
MS ISO 3034:2007	Corrugated Fiberboard – Determination of Thickness
MS 1912:2006	Wood-Based Panels - Fibreboards - Specification
MS 1786:2005	Wood-Based Panels - Fibreboard, Particleboard and Oriented Strand Board - Terminology
MS ISO 13820:2004	Paper, Board and Corrugated Fibreboard – Description and Calibration of Compression – Testing Equipment
MS 398:1976 : 2004	Specification for Corrugated Fibreboard Boxes
MS ISO 186:2003	Paper and Board – Sampling to Determine Average Quality
MS ISO 535 : 2001	Paper and Board – Determination of Water Absorptiveness – Cobb Method
MS 1226 : PART 1 :	Pulverized –Fuel Ash Part 1 : Specification for Pulverized-Fuel Asha

1991	for Use as a Cementitious Component in Structural Concrete
MS 1494:2000	Specification for Billets for Hot Rolled Non-Alloyed Steel Bars and Rods
MS 1495:2000	Specification for Blooms for Hot Rolled Non-Alloyed Structural Steel Sections
MS 224:2005	Retreaded Pneumatic Rubber Tyres for Passenger Cars and Commercial Vehicles - Specification
MS 571 : 1991	Specification for Ingot Tin
MS 18:1971	Specification for Toilet Tissue Paper
MS ISO 15270:2008	Plastics – Guidelines for the Recovery and Recycling of Plastics Waste

Source: SIRIM Berhad 2009. "Malaysian Standards (MS) Online," <http://www.msonline.gov.my/msonline> (accessed 2 November 2009).

4.6. Singapore

SPRING Singapore is the national standards and accreditation body. SPRING develops and promotes internationally-recognized standards and quality assurance to enhance competitiveness and facilitate trade. It is the enterprise development agency for growing innovative companies and fostering a competitive SME sector. They work with partners to help enterprises in financing, capabilities and management development, technology and innovation, and access to markets. Singapore Standards (SS) is the name of the national standard, which is a nationally recognized documents established by consensus. They are functional or technical requirements in the form of specifications for materials, product system or process, codes of practice, methods of test, terminologies, guides etc. (SPRING Singapore 2009).

Table 7. Singapore Standards for Promoting Recycling

SS Number	Title
SS EN 12620: 2008	Specification for aggregates for concrete
SS EN 15167 - 1 : 2008	Ground granulated blast furnace slag for use in concrete, mortar and grout - Definitions, specifications and conformity criteria
SS EN 15167 - 2 : 2008	Ground granulated blast furnace slag for use in concrete, mortar and grout - Conformity evaluation
SS 476 : 2000	High slag blastfurnace cement
SS 477 : 2000	Portland blastfurnace cements
SS 397 - 2 : 1997	Methods of testing cement - Chemical analysis of cement
SS 397 - 21 : 1997	Methods of testing cement - Determination of the chloride, carbon dioxide and alkali content of cement
SS 321 : 1987	Corrugated fibreboard containers for general purposes
SS ISO 15270 : 2008	Plastics -- Guidelines for the recovery and recycling of plastics waste

Source: SPRING Singapore. "Singapore Standards (SS) eShop," <http://www.spring.gov.sg> (accessed 30 October 2009).

4.7. Indonesia

Badan Standardisasi Nasional (BSN) or National Standardization Agency of Indonesia is a non-departmental government institution with main responsibility to develop and conduct standardization activities in Indonesia. The implementation of standardization within the national scope is carried out to build a national system that will be able to support, increase, and guarantee product's quality and/or services as well as to facilitate national products acceptance in global market transactions. Indonesian National Standard (SNI) is the only standard nationally applicable in Indonesia. SNI was formulated by the Technical Committee and defined by BSN. As a national standard for Indonesia, it envisions to reinforce national competitiveness, improve

market transparency and efficiency, and protect consumer safety, public health, environment conservation and safety (BSN 2009).

Table 8 Indonesia National Standard for Promoting Recycling

SNI Number	Title
SNI 15-3781-1995	Abrasive slag for blasting process
SNI 03-2105-2006	Particle board
SNI 01-4449-2006	Fibre boards
SNI 15-3500-2004	Mixed cement
SNI 03-6863-2002	Methods of sampling and testing for fly ash or raw pozzolan as a mineral admixture in portland cement concrete
SNI 03-6468-2000	Methods for planning of high-strength concrete mixture with portland cement and fly ash
SNI 06-3768-1995	Retreading of tyres passenger cars and commercial vehicles
SNI 19-7188.1.1-2006	Ecolabelling criteria - Part 1: Category of paper products - Section 1: Wrapping paper
SNI 19-7188.1.2-2006	Ecolabelling criteria - Part 1: Category of paper products - Section 2: Sanitary tissue

Source: BSN 2009. "Standard National Indonesia," <http://www.bsn.go.id> (accessed 28 October 2009).

5. International Industrial Standard on Recycling

List of industrial standards in Japan and Southeast Asia refer some international standard made by ISO and IEC. International standard is a base for economic integration. International recycling is promoted by standardizing recyclable waste, recycled materials and recycled goods.

Table 9 International Industrial Standard for Promoting Recyling

Code	Name	Country
ISO 15360-2:2002	Recycled pulps -Estimation of stickies and plastics - Part 2: Image analysis method	Philippines
ISO 12460-4	Wood-based panels - Determination of formaldehyde release - Part 4: Desiccator method	Philippines
ISO 11650:2005	Performance of refrigerant recovery and/or recycling	Philippines
ISO 15270:2008	Plastic – Guidelines for the recovery and recycling of plastics waste	Malaysia, Singapore
ISO 22628:2002	Road vehicles – Recyclability and recoverability – calculation method	Malaysia
IEC 60335-2-104:2006	Safety of household and similar electrical appliances - Part 2-104: Particular requirements for appliances to recover and/or recycle refrigerant from air conditioning and refrigeration equipment	Philippines

6. Action Plan for Establishing Industrial Standards for Promoting Recycling

Japan has speeded up the establishment of a Sound Material-Cycle Society in the latter half of 1990s. After some new recycling technologies were developed and new recycling regulation was introduced, the Japanese Industrial Standards Committee developed an Action Program for Promoting Formulation of Environmental JIS in 2000. The committee consists of experts from universities and research institutes and representatives from industrial associations and consumer unions. The Action Program covers standards related to various environmental issues including recycling such as testing method of RDF, oil made by thermal treatment of waste plastics and testing method for recycled construction materials. Some of the items specified in the Action Program have been requested by local governments which wished to promote the use of recycled products in their green procurement program. One of the obstacles to the use or acceptance of recycled products was the fact that there was no clear standards existed to ensure the quality of these products. After JIS for recycled products was established, government could easily

schedule the recycled products in their procurement tender and contract. The action plan was submitted to related technical working groups, which develop draft of industrial standard.

On the other hand, in Southeast Asian countries, action plan nor program to establish industrial standard for recycled goods was not observed. To mobilize the resource to establish such industrial standard, each country should make action plan which prioritize future industrial standard for recyclable waste, recycled material and recycled goods.

The effort to establish industrial standard for promoting recycling should be linked with R&D activities in recycling technology and newly developed recycling technology. For example, Japan made industrial standard for ecocement in 2003, after the demonstration project in 1995 plant and operation in 2001.

7. Conclusion

This paper reviews industrial standard for recyclable waste, recycled materials and recycled goods in Japan and selected Southeast Asian Countries. Each Southeast Asian country has some industrial standards for recycled materials and goods. Compared to Japan, the number of industrial standard for promoting recycling is limited. Japan has speeded up the standardization for promoting recycling since 2000, based on the action plan made by expert committees. This paper recommends to Southeast Asian countries that similar action plan should be developed.

Some countries also made standard along with international standard such as ISO. From the view point of promoting recycling internationally, international standard should be developed further. It may be beneficial to prioritize some standard for promoting recycling in Southeast Asia, to develop common standard and to propose the standard in ISO.

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