

# ACETYLENE GAS SAFETY SEMINAR 2009



239  
1001



Asia Industrial Gases  
Association



Council of Labor Affairs  
Executive Yuan



Taiwan High Pressure  
Gas Industrial Association

**SAHTECH** 財團法人  
安全衛生技術中心

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# Recycling of disposed (scrapped) Acetylene Cylinders

## – CRC Nishi Nippon Experience



By (Hiroshi Saitou)  
CRC Nishi Nippon (Western Japan)  
Corporation

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1. Establishment of CRC Nishi Nippon
2. Acetylene cylinders treated
3. Disposal flow chart
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7. Publicity and the future outlook

## Treatment

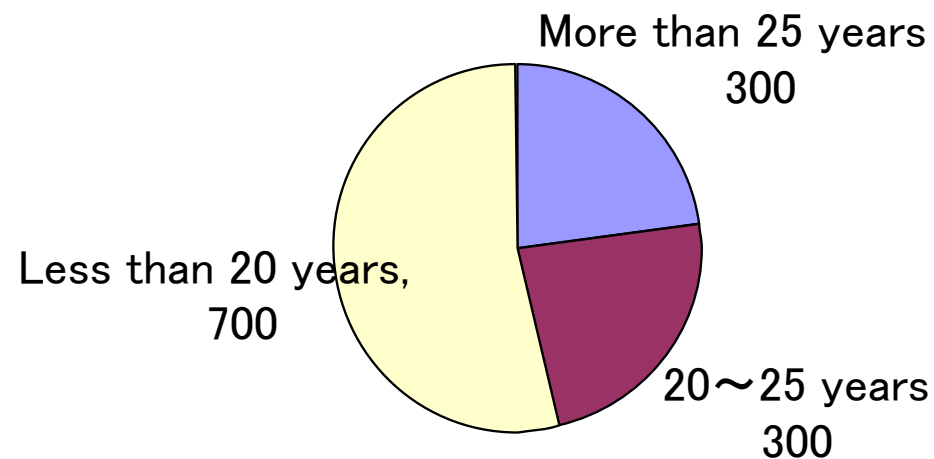
→The whole process from  
scrapped cylinders to final  
products



# 1. Establishment of CRC Nishi Nippon

# Duration of usage of Acetylene Cylinders in Japan

Cylinder numbers used (x 1,000)



2002 Study Report

# Getting consensus on the Acetylene cylinder treatment business





# CRC - Company Profile

■ Established: Nov 21, 2003

■ Purpose: To undertake the scrapping of high pressure cylinders and the safe pre-treatment of cylinders to be recycled inline with the social responsibility on safety and preservation of the environment.

■ Investors: 14 member companies of JIMGA. Initial capital =100 million yen.

■ Operations:

- ★ Scrapping of high pressure gas cylinders
- ★ R & D of technology for re-use of high pressure gas cylinders and the dissemination of related information
- ★ All operations involved in or related to the above

■ Treatment capacity:

Acetylene cylinders	40,000 cyl./year
Special gases cylinders	5,000 cyl./year
Other gas cylinders	1,000 cyl./year



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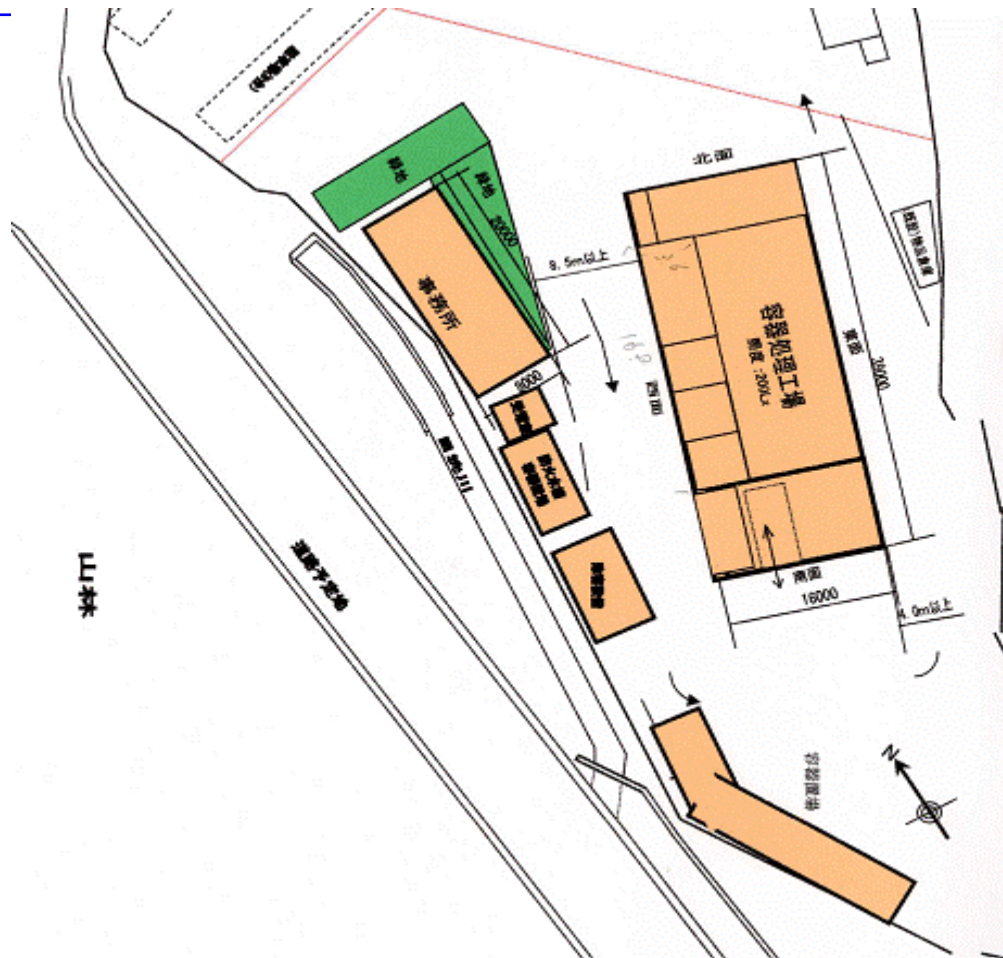
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# View of the CRC Plant



# Layout of the Plant



Land area : 3,650m<sup>2</sup>

○ Operating area : 621m<sup>2</sup>

(Breakdown )

For acetylene cyl. : 456m<sup>2</sup>

For special gases : 165m<sup>2</sup>

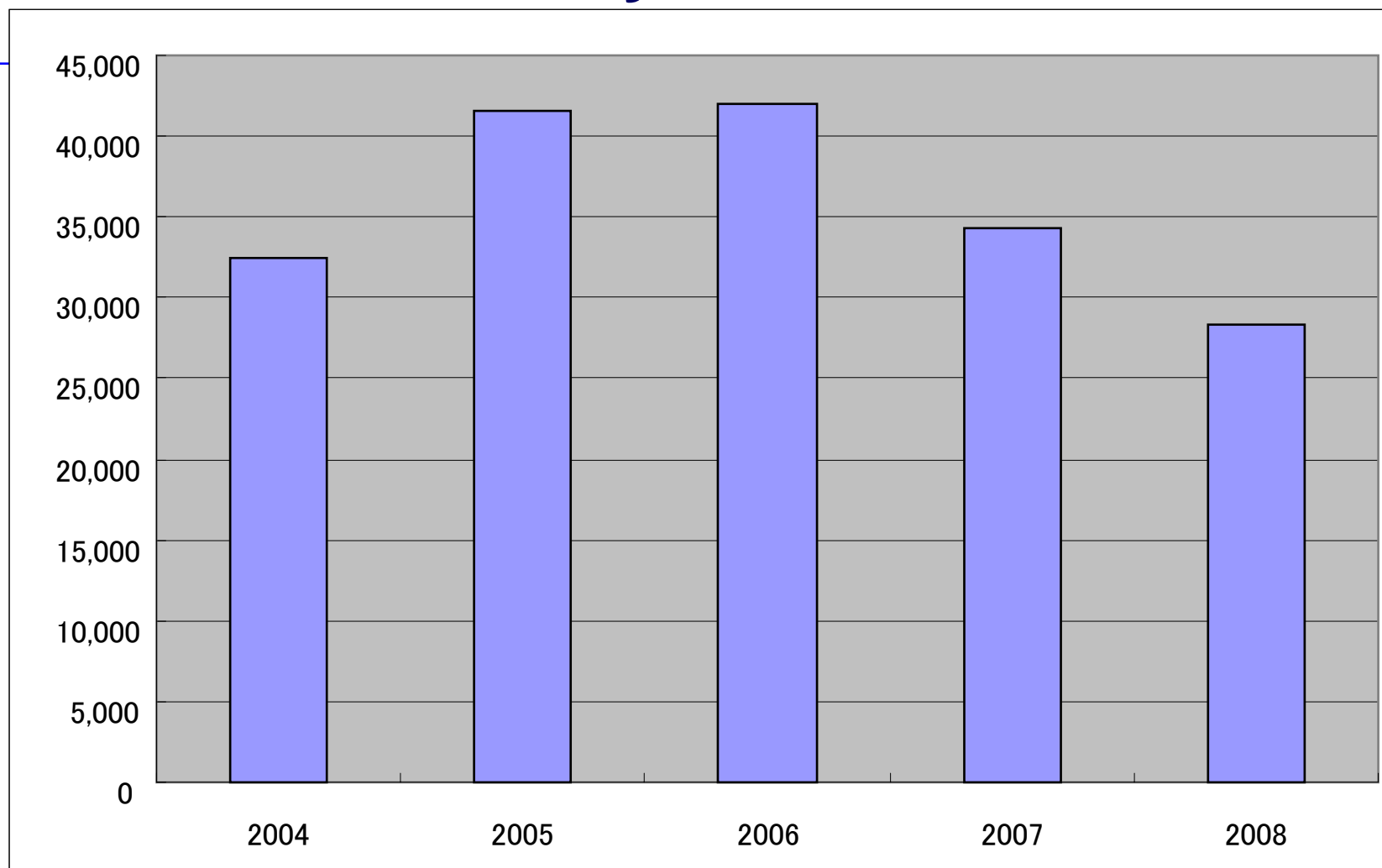
○ Office use : 166m<sup>2</sup>

**Address:**

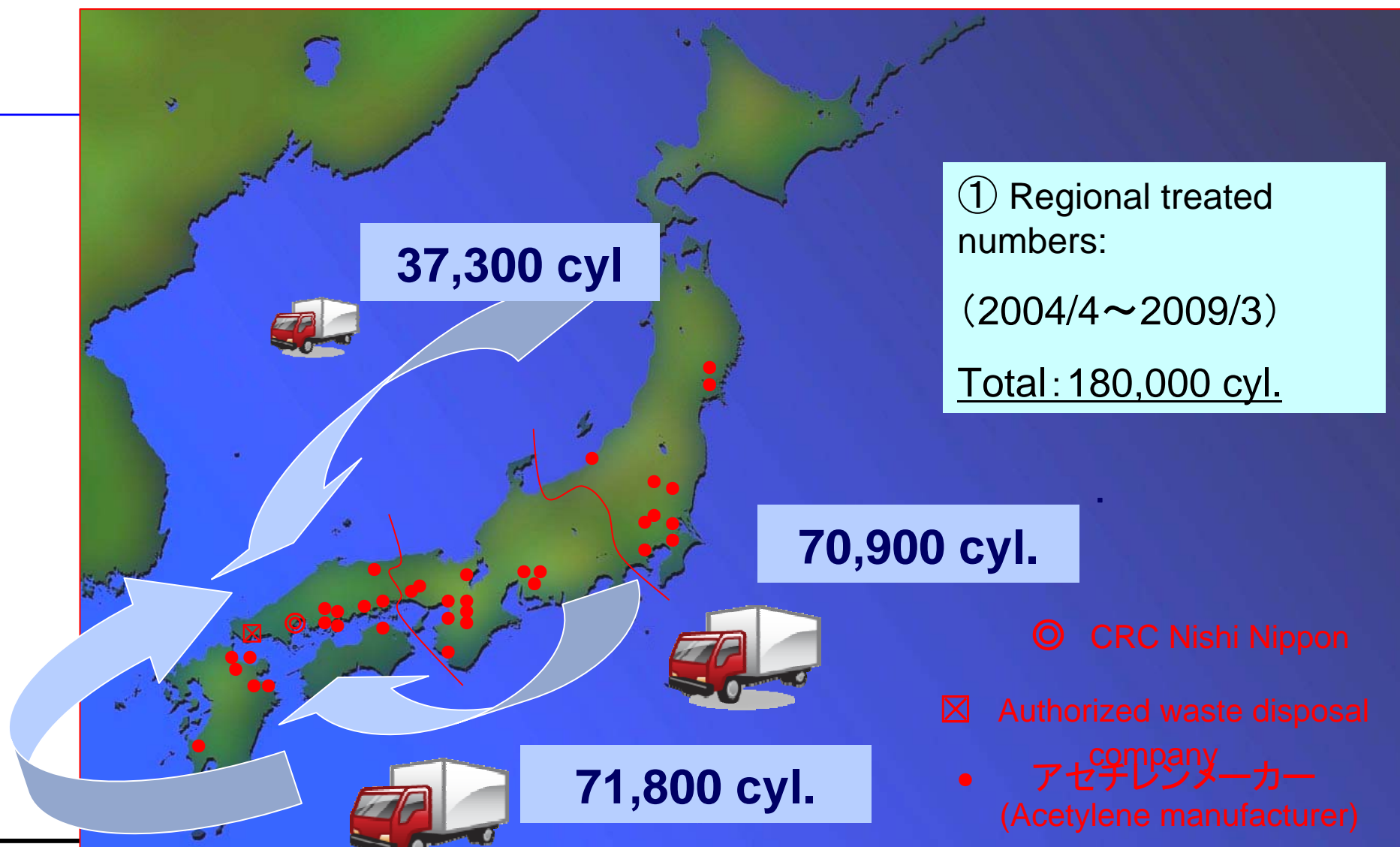
**Wagi-Cho, Kuga-Gun,  
Yamaguchi Prefecture**

## 2. Acetylene Cylinders Treated

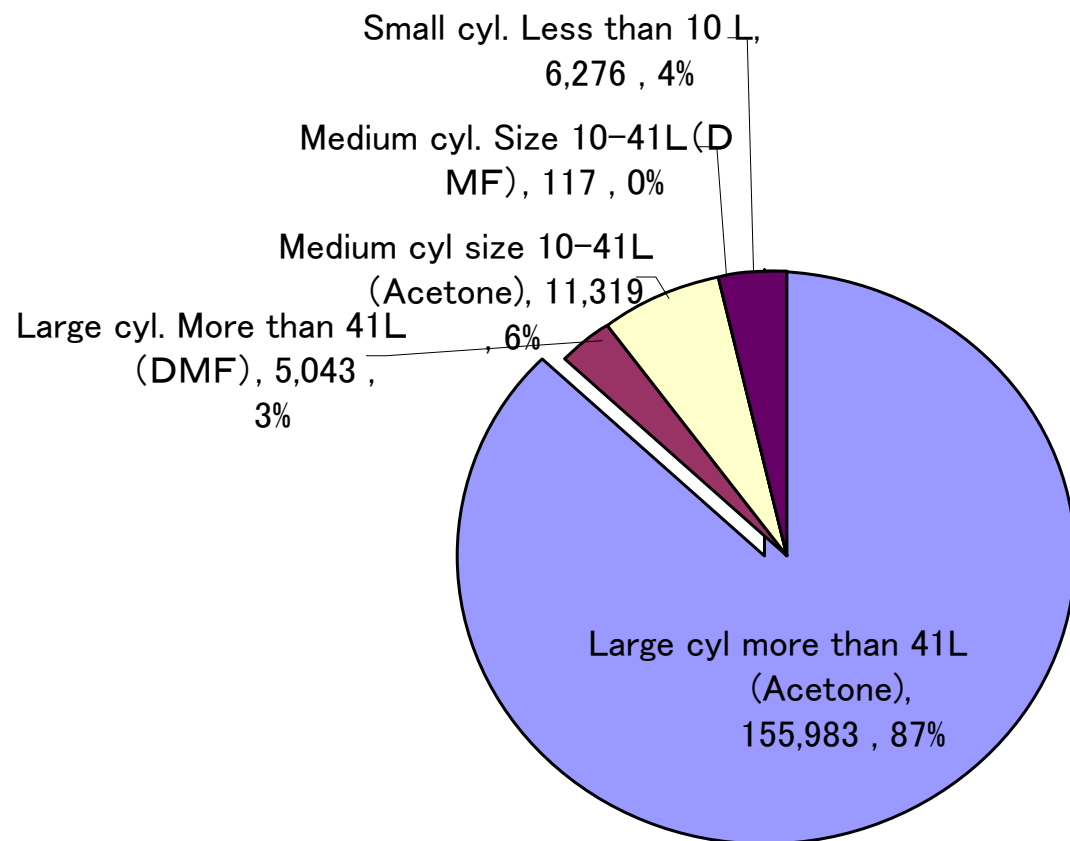
# Number of acetylene cylinders treated - by Year



# Acetylene cylinders treated – by regions



# Acetylene cylinders treated- by types of cylinders



Small cylinder

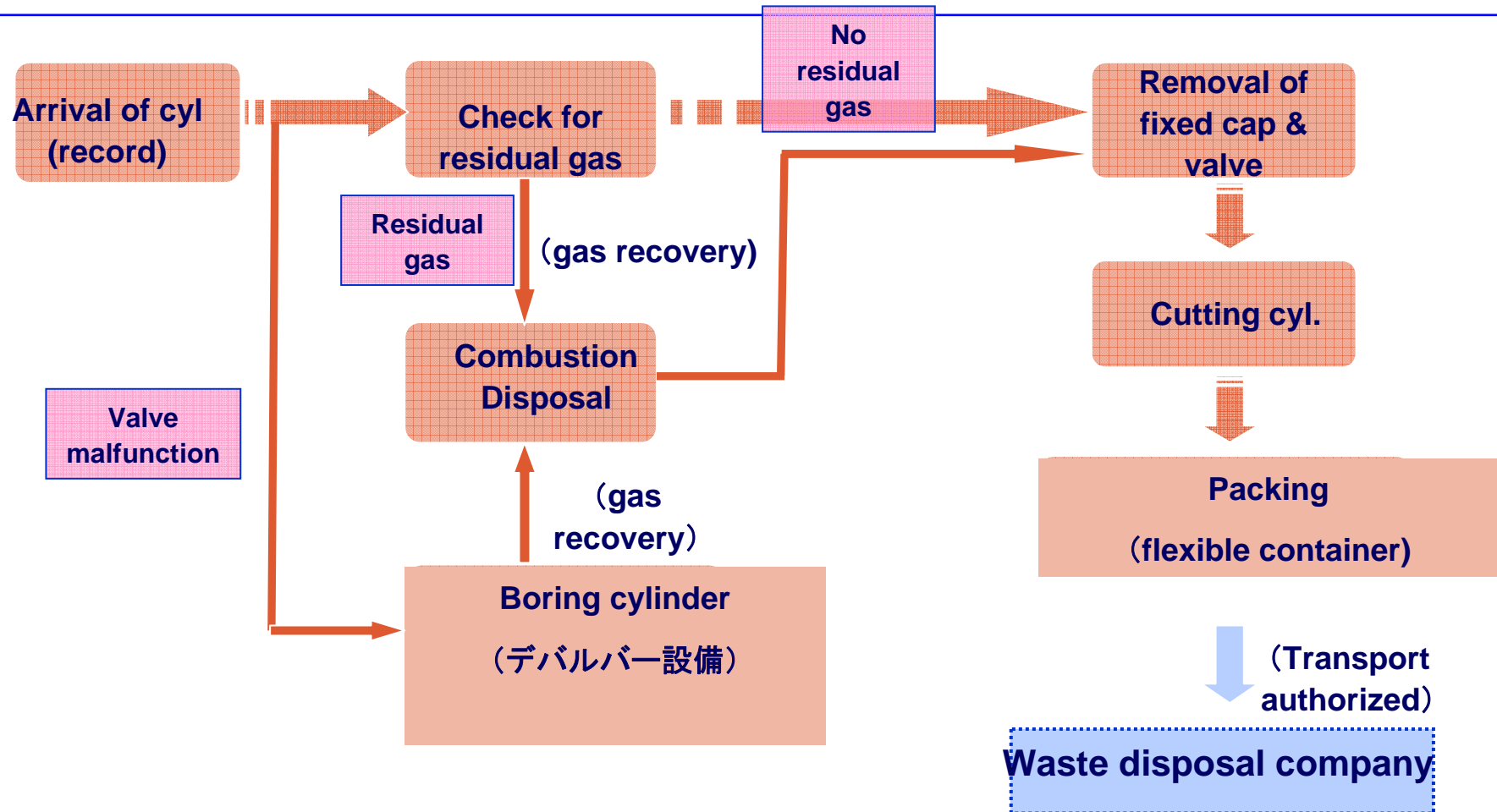


Large cylinder

### 3. Disposal flow chart

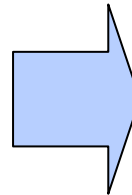


# Disposal flow chart



# Acetylene cylinder disposal process ①

## (Arrival & Off-loading)



**250～400cyl./truck**

**2500～3500cyl./month**

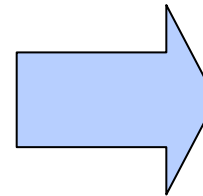
**Unloading**

# Acetylene cylinder disposal process ② (Venting of gas)



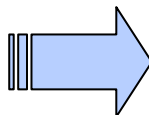
**Gas recovery unit**

(20 cyl. manifold for Acetylene cylinders)



**Flare stack**

# Acetylene cylinder disposal process ③ (in case of valve malfunction)



**Boring (drilling)**

**Capacity : 400L**

**Hydro test pressure:  
4MPa**



**De-valve container (coffin)**



# Acetylene cylinder disposal process ④ (Removal of cap & valve)



Cap cutting machine



Valve removal machine

# Acetylene cylinder disposal process ⑤

## (Cutting of cylinder)



**Cutting machine**



**Cylinders after cutting**

**(Cut cylinders are covered in order to avoid injury & scattering of asbestos)**

# Acetylene cylinder disposal process⑥ (Packing)



**Putting into flexible container**



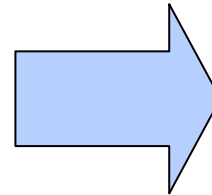
**500Kg/container(approx. 10 cylinders)**



# Acetylene cylinder disposal process ⑦ (Shipping out)



14,000Kg/truck going to the  
authorized waste disposal  
company



Being reclaimed as steel  
product in electric arc furnace

◎Process①~⑦ takes approx. 7 minutes/cylinder

## 4. Regulations governing cylinder treatment in Japan

# Regulations for Acetylene cylinder treatment

## Applicable regulation: High Pressure Gas Safety Law

**Article 56: The owner of the cylinders shall scrap or otherwise dispose of them in case they are not suitable for gas filling without delay**

Related regulations	Items to be enforced
Labour, Safety & Health Regulations Regulations on asbestos - health risks	Appointment of operating chief Installation of local ventilation system & conduct test measurements (once/6 months) Personnel health check (once /6 months)
Waste treatment regulations	Contract with waste disposal company Requirements for Waste management manifest

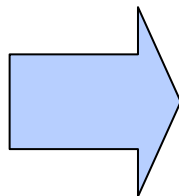
# Safety Measures

For:	Items to be performed
Work area	Monitoring by gas detectors Measuring work environment
Worker	Training course for operating officer Training on major incidents control
Facility	Routine self-inspection Daily inspection

# Prevention of asbestos scattering



**Cutting machine for  
cylinders (saw)**



**Hood & suction dust extractor**

**Filter collection efficiency 99.97% ( $0.3 \mu\text{m}$ )**

**Evacuation volume :  $33.0\text{m}^3/\text{min}$**

# Results of work area measurement

	Material	Allowable concentration limits	Actual
Work environment	Asbestos	0.15 (units/cm <sup>3</sup> )	<0.015(units /cm <sup>3</sup> )
	Acetone	500(ppm)	50(ppm)
Area at the work place boundary	Asbestos	10(units/L)	<0.3(units/L)

## 5. Waste Manifest System



# Waste manifest system

Discharging company shall issue the manifest (industrial waste management record) and to confirm the correct transmission of treatment information and the proper treatment –



Responsibility of the discharging company

7 sets of documents:

A票: CRC西日本控え

B1票: 収集運搬業者控え

B2票: 運搬終了を確認

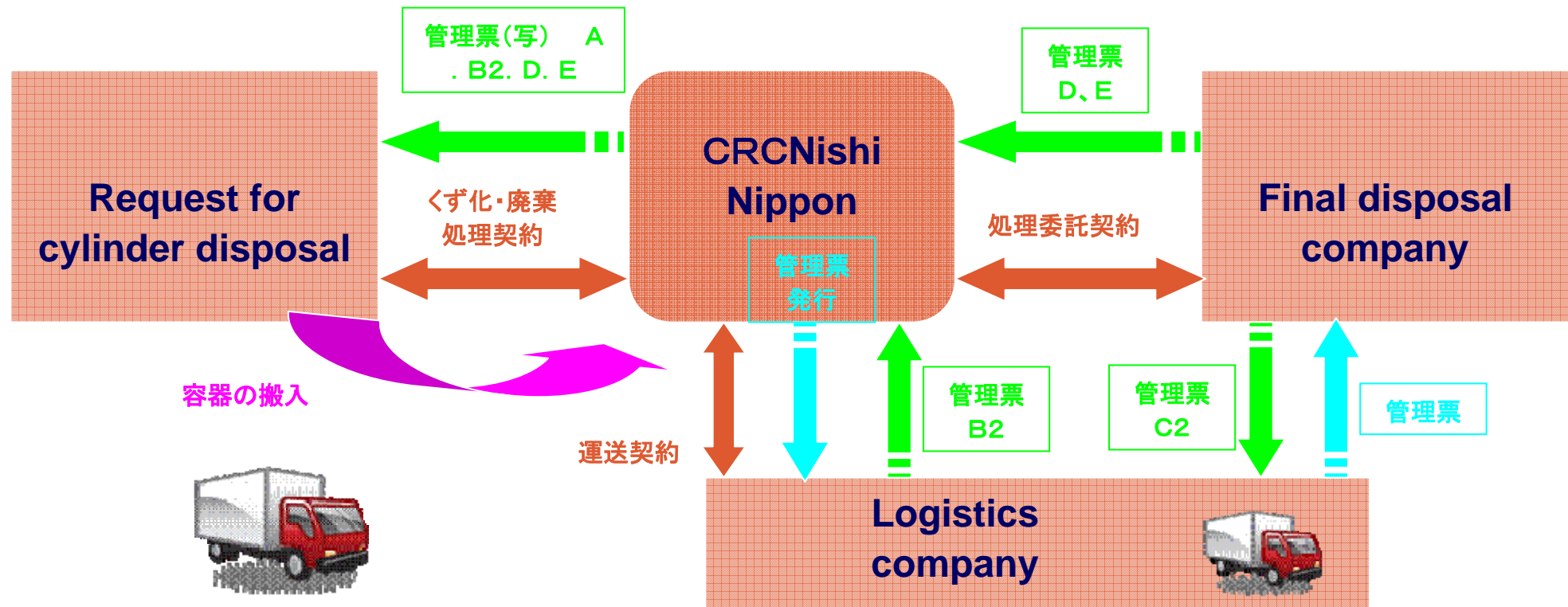
C1票: 最終処分業者控え

C2票: 運搬業者が処分終了を確認

D票: 処分終了を確認

E票: 最終処分終了を確認

# Industrial waste cylinder process flow



## 6. Cost of treatment of cylinders

# Breakdown Cost of treatment of cylinders

2008 Actual result (including specialty gases cylinders)

Expenses	Items	Ratio(%)
【Production cost】		76
	Labour	13
	Materials	20
	Depreciation	20
	Others	23
[Sales & Admin]		24

## 7. Publicity & Future Outlook

# Success pointers of cylinder treatment business



# Publicity Activities

## JIMGA's activities

◎Prepare guidelines for acetylene cylinder life.

- 38 years of use (for cylinders using asbestos mass)

◎Distribute guidelines and pamphlets

- to acetylene manufacturers and sales agents

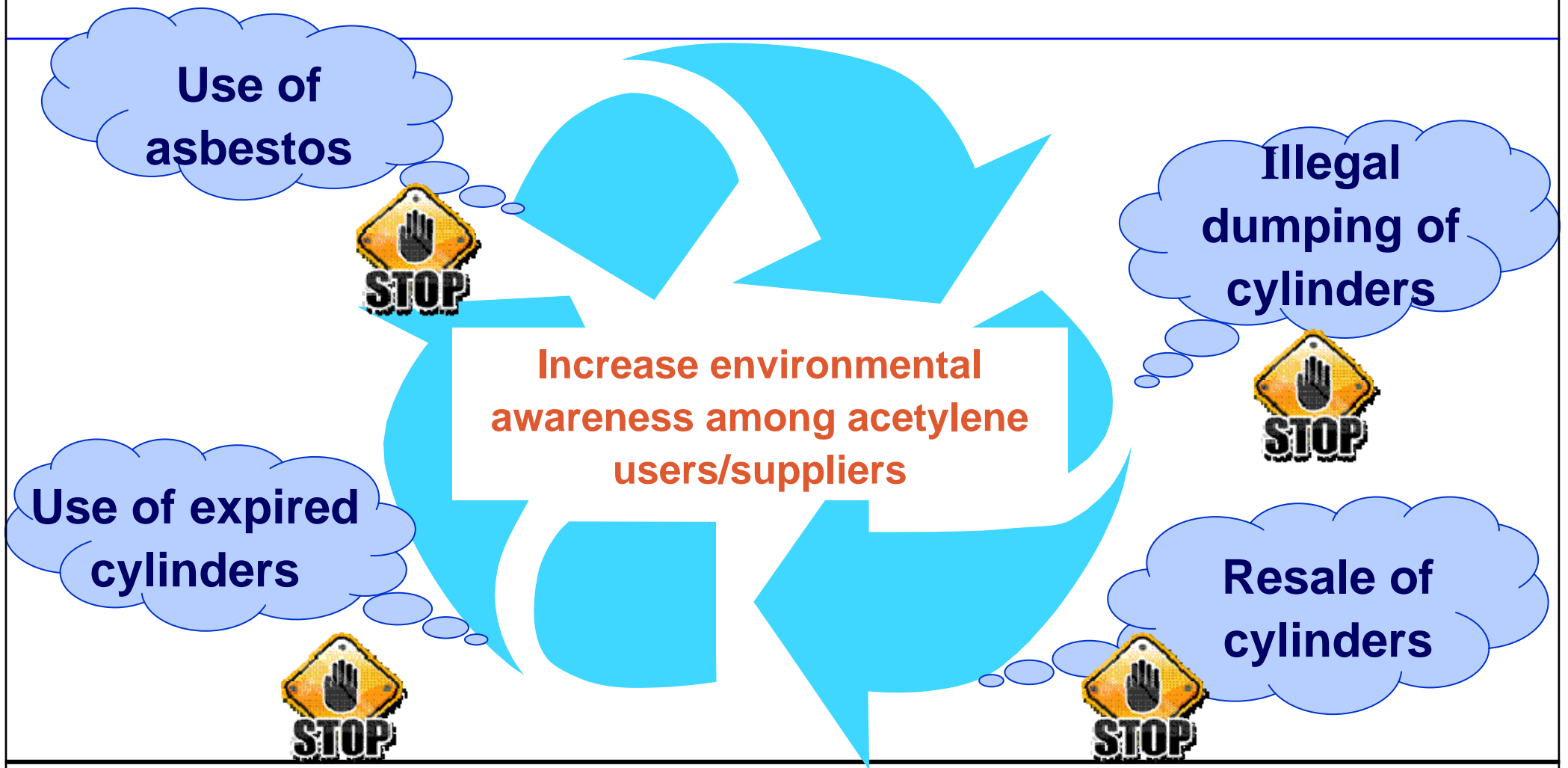
◎ Introduce and promote CRC Nishi Nippon

- publish in Association magazine



# Future Outlook

In order to promote cylinder treatment



Thank you very much



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