



# OKAYASU Breakthrough in manufacturing RUBBER

Realize the change you want  
Okayasu Rubber Co., Ltd.

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# OKAYASU RUBBER

## Realize the change you want

For nearly 90 years since our founding, we have continued to supply products using chemical materials, mainly rubber parts. The rubber component supplier that we belonged to at that time was too small to meet the demand.

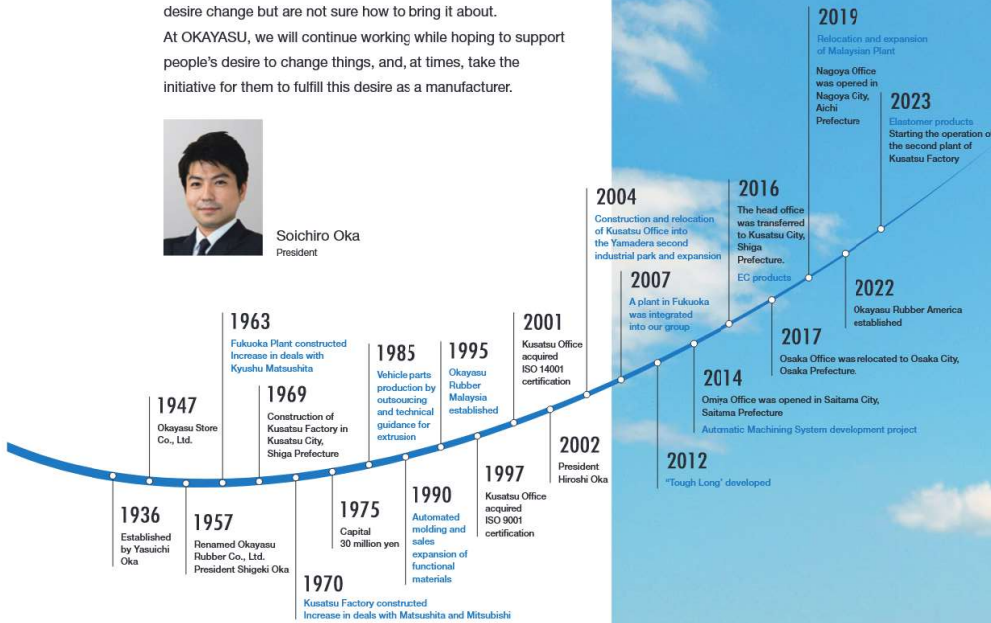
Our company was founded as a trading company but changed to a manufacturer and then has continued making efforts to introduce new technologies including those from other industries, leading to the current reputation as a reliable, distinctive manufacturer.

We have been changing while keeping the venture spirit and prompt actions in mind, which has led to successful overseas expansions in Malaysia and the United States, and business diversification into other types of products in addition to rubber. Our company's present reputation is attributable to our everlasting business philosophy that helps such customers who desire change but are not sure how to bring it about.

At OKAYASU, we will continue working while hoping to support people's desire to change things, and, at times, take the initiative for them to fulfill this desire as a manufacturer.



Soichiro Oka  
President



## Vision

—Vision—

Company associates, business partners and all other members of society  
achieve three types of happiness

**Bond** Connection with important people and society

**Pride** Rewarding challenges and self-realization

**Emotion** Moving experience

## Value Breakthrough in manufacturing

—Value—

**Mission** —Mission—  
Realize the change you want

**Culture** —Culture—

1. Support and reward all people who are willing to face challenges regardless of their age, gender or personal history

2. Pursue highest speed and efficiency to shape as many ideas as possible

3. Value connections with people and society, and respect people who care about others.

Speed and efficiency are our essential properties

Questions and awareness are our forte

Improvement and challenging spirit are indispensable for our success

Delights shown by the post-processes are our pride

# We are flexibly responding to customer requests to make breakthroughs.

## Breakthrough Point

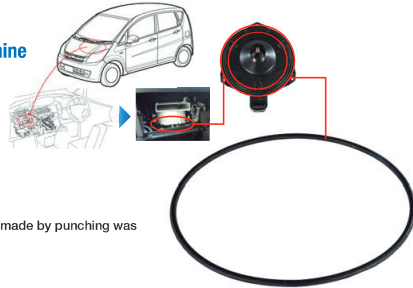
### Developing our own automatic adhesive machine for mass production of endless products

#### Case. 1 Blower motor seal

<Application> Water packing piece for automobile air conditioners

#### "Customer need/problems"

- Some customers complained that flat rubber packing piece made by punching was too hard to protect water from leaking.
- We need large lots of sponge rubber endless products.



#### — CUSTOMER ACTION —

#### 1 Requirement

Okayasu Rubber had been supplying EPDM sponge as a sealant and wanted to adopt the same sealant even after the end user's specifications were changed. Quality requirements included those for peeling strength, sealing performance and heat resistance. A mass production system that is large enough to meet the year-by-year increasing demand should be established as soon as possible.

#### 3 Evaluation using samples

Water leakage occurred where the adhesive was forced out and hardened. Evaluation result: No Good The hardened adhesive caused a gap to be produced in the packing mating part, leading to water leakage.

#### Feedback

#### 5 Evaluation using samples

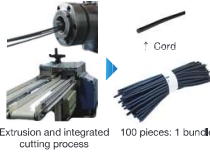
Testing samples showed a satisfactory result.

#### 6 Production process review

<Manual adhesion using a jig>

##### Roll production

While producing a cord of sponge rubber by extrusion, it is cut into sections. Make a bundle of 100 pieces.



Extrusion and integrated cutting process 100 pieces: 1 bundle

#### 4 Developing an adhesive

#### — OKAYASU ACTION —

#### 2 Developing an adhesive

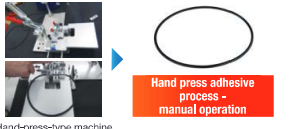
Instantaneous curing of adhesive was required for mass production. There was a problem that EPDM material itself was generally difficult to adhere. First, a conventional instant adhesive being used for EPDM materials was submitted and studied.

#### 4 Developing an adhesive

Cooperating with adhesive manufacturers, we developed a special adhesive. Post-curing hardness of adhesive was reduced; and adhesive holding time was reviewed. Peeling strength test, water leakage test and aging test were carried out by our company. Submitted samples.

#### Hand press adhesive process - manual operation

Daily production of 150 work pieces per 8 hours/day operation  
All operations of clamping both ends of each piece of sponge rubber, applying adhesive and operating the lever clamp are completely manual.



Hand-press-type machine Hand press adhesive process - manual operation

#### 7 Start of mass production

Developing a semiautomatic system using

##### Roll production

While producing a cord of sponge rubber by extrusion, it is cut into sections. Make a bundle of 100 pieces.



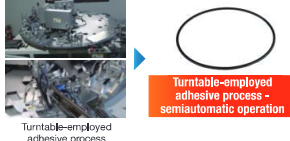
Extrusion and integrated cutting process 100 pieces: 1 bundle

#### Improving production efficiency and quality

<Turntable-Employed Semiautomatic Adhesive Machine>

##### Turntable-employed adhesive process - semiautomatic operation

Daily production of 450 work pieces per 8 hours/day operation  
Sponge rubber is set in the jig, and the holding tool is operated by a foot pedal. Start clamping by pressing the start button. Estimate the process capability that affects the peeling strength.



Turntable-employed adhesive process Turntable-employed adhesive process - semiautomatic operation

#### — CUSTOMER ACTION —

#### 9 Production statistics

Increasing mass production

<Statistics in annual production>



Year	Production/year	Total production (length in m)
2014	1,500	740
2015	132,639	65,660
2016	710,891	351,890
2017	2,004,962	992,400
2018	3,299,032	1,633,020
2019	3,652,868	1,808,170
2020	3,080,448	1,524,820
2021	2,697,115	1,335,070
2022	2,696,909	1,334,970

Production

#### — OKAYASU ACTION —

#### 10 Increasing production

Increasing supply capacity along with the increase in demand and improving quality. Semiautomatic production cannot meet customer demand.

#### Production efficiency

#### Development of <Automatic adhesive machine>

##### Roll production

Sponge rubber is automatically wound on a drum.



Automatic winding

##### Automatic adhesive process - automatic operation

Daily production of 1,800 work pieces per machine per 22 hours/day operation

Set the material roll drum in the automatic machine. Cut the roll, apply adhesive, and adhere sections to produce the endless product. Unattended operation



Automatic adhesion

Measure and cut the roll material by the automatic machine.

Automatic application of adhesive using a machine <Adhesive application>

Automatic adhesion using a machine <Adhesion>



Place the work piece that has been automatically adhered by the machine into the box. <Transfer the finished product to the box>

Automatic adhesive process - automatically adhered work pieces

#### Quality control (Final inspection)

##### Inspection process

##### Manual

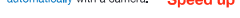
Visually inspect the upper and lower limits of the adhesive inner diameter using a jig. Using a jig, check that the number of work pieces per bundle is 25. Pack 100 work pieces in a bag.



Count the number of work pieces in groups of 25.

##### Automatic

The inner diameter of the adhered section and the number of work pieces processed are measured automatically with a camera. Speed up



Breakthrough

#### Previous production

- A piece of solid flat packing was used
- Water leakage
- Producing the endless product uses manual adhesion to connect sections, with no mass production being available.



Conventional flat packing (Conceptual image)

#### New production

Production capacity
Manual adhesive operation: 150 work pieces/day
8 hours operation
3 times
Turntable-employed semiautomatic process: 450 work pieces/day
8 hours operation
4 times
Automatic adhesive machine: Daily production of 1,800 work pieces/day/machine
22 hours operation

12 times larger

Realize the change you want  
Realize wants of "Change"

Automatic adhesion between sections of an endless part  
Successful Mass Production!

Consultation, Quotation and Order

Trial production



We are flexibly responding to customer

requests to make breakthroughs.

Breakthrough Point

Okayasu Rubber's production technologies are available for integrating the primer coating and taping processes into the line (extrusion process).

Case.3 Protector

<Application> Overfender for wheel arch (gap filler)

"Customer need/problems"

- It was an exterior part that remained yet to be coordinated with the surroundings in detail, so that mass production needed to be established with the minimum lead time after the specifications of the part were finalized.
- Four different types of parts: **taped**, total 42,000 m/month
- Extrusion process is carried out by other companies than those who are responsible for other manufacturing processes, which implies that it may be difficult to meet the target cost indicated by the end user.

CUSTOMER ACTION

1 Request

Low-cost, high-quality products would be delivered in time. Due to a shorter lead time to trial production, it would be started for all four different parts soon after our estimate is issued.

3 Trial production - order

Two days after receiving our estimate, trial production of the four different parts would be ordered. All of the four parts would be delivered in one month.

5 Discussion for trial production

Tier 1: Visited together. Advised that taping be performed in an integral manner in the mass production phase. Schedule adjustment.

6 Check before mass production

Detailed adjustments such as packing specifications. Products taped by the in-house process submitted.

OKAYASU ACTION

2 Internal review and estimation

First, extrusion + primer coating, followed by taping by outsourcing. For mass production, in-house taping has to be studied.



4 Trial production

After extrusion of four different types of parts, detailed adjustments shall be made for the nozzles. A primer coating jig was developed for integrated coating operation. Taping performed at the later process.

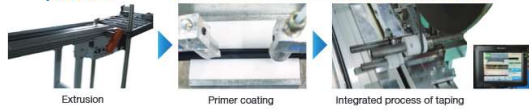


7 Preproduction preparation

Develop an integrated taping machine (our own design). Install cameras that monitor taping that is out of place.

8 Production process

Integration of the post-processes  
A single-line configuration of all processes



9 Mass production

Meet the QCD requirements - low cost, high quality and short lead time.



Consultation, Quotation and Order  
Trial production and meeting  
Production  
Breakthrough

Realize the change you want  
Realize wants of "Change"

A single-line operation of all processes leads to achieving the target cost!

Breakthrough Point

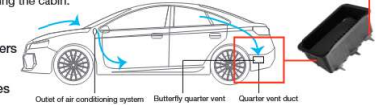
One-stop production system & Follow-up for process improvement

Case.4 Butterfly quarter vent 2 kinds (black and gray)

<Use> The butterfly is installed as a non-return valve at the cabin air discharge opening (duct quarter vent) to prevent exhaust gas and dust from entering the cabin.

"Customer need/problems"

- We have to respond to requests for cost reduction from end users
- Requirements
- Focus on butterfly quarter vents being used in large quantities



CUSTOMER ACTION

1 Requirements for the product

Requirements for specifications (dimension etc.) and quality. It is necessary to evaluate the weather resistance using cold and heat cycle testing that simulates the actual onboard climatic environment.

Point Rubber sheet manufacturers use large-scale manufacturing facilities leading to larger equipment costs and fixed costs. The thin rubber sheets also raise the cost. Commercial rubber sheets of standard sizes, different from the desired size, cause the yield to decrease.

3 Discussion

Internal processing Using a wide continuous extrusion & vulcanization facility, extrude a thin rubber sheet whose width is appropriate for improving the yield, continuous punching. Cost reduction achieved by increasing yield and reducing transportation costs and processing costs. As a result, the product price was reduced by 15%. Cold and heat cycle testing was carried out using the test equipment of Okayasu Rubber.

5 Trial production - order

According to the discussion results, trial production was ordered.

7 Sample evaluation

Samples and all evaluation items could meet the requirements.

9 VA review and process improvement

The manual assembly process was reviewed with a view to robotization.

Problems Work pieces stick to each other in the assembly process, so that the robot cannot take them one by one leading to failure in assembly (work pieces in black stuck to each other while those in gray didn't).

12 Trial production

The robot system can produce 1,000 work pieces as a trial production (the previous system required additional work for separating sheets and removing jamming once in 20 cycles of operation). The robot system is free of such errors. Successful VA through the follow-up after starting mass production.



<Advantages> Replacing the one-sheet supply system with a two-sheet system as a feeder of rubber sheet material led to a larger yield and smaller processing cost.

OKAYASU ACTION

2 Internal review

Focusing on production processes and commercial flow.

Production process

<Previous system> Ready-made rubber sheets purchased from a manufacturer were transported to a processing company where they were processed and then delivered. Since the product is as thin as 0.3 mm or 0.5 mm, the processing cost is high, and the post-transportation process by other companies raises the cost further. Both these cost-raising factors can be eliminated by changing the processes to in-house ones.

4 Internal review

Develop a compound material appropriate as a thin, wide rubber sheet for continuous extrusion. Modify the existing facilities so that they can be used for continuous punching of thin sheets. Develop an automatic machine for winding rubber sheets.

6 Trial production and test

Trial production using a two-sheet feeding system in place of the previous one-sheet system to improve production efficiency. Cold and heat cycle testing was carried out for the samples produced by trial production. Requirements for product dimensions and cold/heat weather resistance could be met. Parts produced by trial production were delivered.

8 Mass production

Two-sheet system → Automatic sheet winding → Continuous punching

10 Internal review

Study how to solve the problem of sheet-to-sheet sticking. The sheets in gray that did not stick to each other were chosen for study as a possible material.

11 Trial production

Eliminate sheet-to-sheet sticking. Test the hardness, tensile strength and elongation using sheet samples.



Automatic winding machine  
Roll of sheet material used for continuous punching  
Continuous punching

Consultation, Quotation and Order  
Trial production and meeting  
Production and breakthrough

Realize the change you want  
Realize wants of "Change"

Cost reduction with a one-stop production system  
Process improvement via follow-up

Successful improvement!



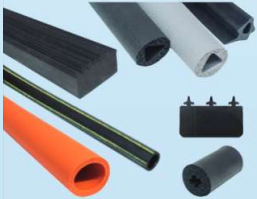
# Okayasu supports your life behind the scenes.

As a manufacturer, our company handles products of various materials and shapes.



## Vehicle related

- Car protector
- Insulator rubber
- Water packing for car air conditioner
- Seat for cabin air pressure regulating valve
- Rubber for bonnet cushion
- Buffer material for weather strip
- Grommet for car wiring
- Cushion for fuel tank
- Cable protector



## Components for light electrical appliances

- Vibration-damping rubber for air compressor
- Rubber bush for air compressor
- Silicone spacer
- Airtight packing for blackboard eraser
- Vibration-damping sponge rubber
- Pipe fastener for outdoor unit
- Drain air backflow preventer
- Air conditioner drain hose



## Infrastructure, building, and industrial use electric power related

- Seat ring for butterfly valve
- Sound insulation outlet cover
- Water cover for balcony
- Water packing for traffic signal
- Braille tile for the visually impaired
- Door rubber packing
- Doorstop rubber
- Shutter sponge
- Light-shielding packing
- Rubber for jointing between floor tiles
- Waterproof gap-filling plate for building material



## Housing equipment related

- Rubber plug for bathtub
- Rubber nut for toilet
- Light shielding packing for lighting fixture
- Stop offsetting mat
- Highly foamed cushion for toilet base
- Perforated rubber lid for sink
- Cord bushing for water faucet
- Floor mat for bathroom
- Waterproof packing for switchboard



## Food, medical and nursing care related

- Packing for medical pail
- Slope board for wheelchair
- Rubber hose for cryotherapy
- Slip-preventive rubber for handrail to help people stand
- Medical wrist band



## Miscellaneous

- Umbrella stop
- Rubber bat for practicing swinging
- Jump rope grip
- Grip for lawn mower



## OKAYASU Brand (Okayasu Rubber Standard Products)

Utilizing our own technological capabilities, we have developed unique, standardized products. Our products are available also on the Internet shops of Amazon, Yahoo and Rakuten.



### "Tough Long" series

- "Tough Long" ES5
- "Tough Long" sheet
- "Tough Long" microcell



### Fukureku series

- Kitchen floor mat
- Toilet floor mat
- Washstand floor mat
- Fatigue-reducing floor mat



### Round cord series

- Rubber seal (round cord, solid)
- Tough Seal (round cord, sponge)



### Small parts produced by extrusion

- Sponge pipe
- Sponge square cord
- Sponge semicylindrical cord
- U-shape grooved rubber



### Mamoru-kun series

- Orange-brown 5M
- Orange-brown 10M



### Rubber plates

- Rubber plate (solid)
- Sponge rubber sheet (sponge)



## Integrated system from design to production. Taking advantage of our capabilities of designing production processes, we shall continue creating integrated, one-stop production systems.

Our one-stop production systems consisting of our own designed general-purpose machines will lead to higher efficiency in production.  
We are actively investing in developing processing machines and robots.

### Production Process



### Corporate Profile

Company name	Okayasu Rubber Co., Ltd.
Start operation	April 9, 1936
Founding	April 9, 1947
Capital	30 million yen
President & CEO	Soichiro Oka
Number of employees	202 (group total), 97 (Okayasu Rubber only)
Head office	271-1 Yamadera-cho, Kusatsu-shi, Shiga 525-0042 Japan
Phone number	077-562-7271 (switchboard number)
Domestic sales offices	Shiga, Osaka, Saitama and Aichi
Domestic plants	Shiga (site area: 15,626 m <sup>2</sup> ; total floor area of buildings: 6,453 m <sup>2</sup> )
Overseas plants	Malaysia
Overseas branches	United States of America



Our social media accounts:



### Environment and CSR

#### ISO certificate acquisition status

- **Head office plant** ISO 14001:2015 acquired on February 27, 2001  
ISO 9001:2015 acquired on March 28, 1997
- **Malaysia Plant** ISO 9001:2015 acquired in March 2005  
ISO 14001:2015 acquired in March 2004

### Business Bases

#### Head Office Plant

271-1 Yamadera-cho, Kusatsu-shi, Shiga, 525-0042 Japan  
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Consistent operations for designing compounds of rubber materials, designing and manufacturing molds and dies, processing, and quality assurance.



#### Osaka Office

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For telephone inquiries, please contact the head office.



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TEL: 080-8943-1599



#### Omiya Office

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Web: <https://www.okayasu-rubber-malaysia.com/>  
We can meet the needs of customers using the same quality assurance systems and facilities as those in Japan, but at lower cost.



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