

The Importance of Genuine Parts and Periodic Replacement



First version: August 7, 2014
Revised: June 18, 2015
TADANO Ltd. Parts Sales Department

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1. Periodic replacement parts and important periodic replacement parts

(1) Periodic replacement parts

The parts which must be replaced periodically even if there is no problem with their function in order to maintain product **safety** and **quality**



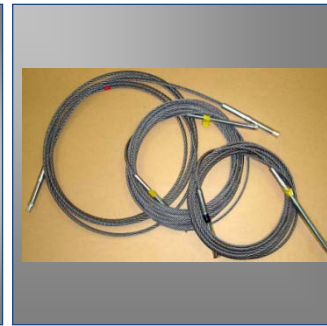
Oils & greases



Filters



Hoses and seals



Telescoping wire ropes

(2) Important periodic replacement parts

The parts which must be replaced periodically even if there is no problem with their function in order to maintain product **safety** and **quality**, and which have particularly important safety functions.



Brake fluid



Winch facings



Rotary joints



Wire ropes

2. About genuine parts

"Genuine" means **real and true, pure and unadulterated.**

The parts sold by a product manufacturer are classified into the following 3 types.

- (1) Parts which are produced by the product manufacturer itself.
- (2) Parts which are produced by a part manufacturing company based on instructions from the product manufacturer
- (3) Ordinary standard general-purpose parts

Genuine parts are "parts which are the same as those used by the product manufacturer, or which are equivalent to these parts and are sold with the authorization of the product manufacturer".

Therefore, although a part manufacturer which manufactures genuine parts may also engage in direct sales of parts which are identical to those delivered to the product manufacturer and which it conveniently calls "genuine" or "genuine compatible", **the parts manufacturer has not received authorization to sell such parts.**

When such parts are used, the product is no longer strictly genuine, and it may be impossible to receive manufacturer warranty coverage or complaint resolution services.

At TADANO as well, although some part manufacturers have been seen selling parts by visits to dealers or on the Internet, TADANO has not certified these parts as genuine parts. This means that **manufacturer warranty coverage and complaint resolution services will not be available if these parts are used.**

3. Oil filter

● Imitation parts

(1) Smaller filter surface area (smaller number of fold ridges)

Genuine

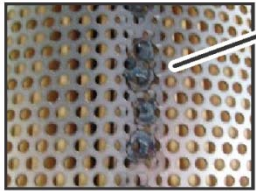


Imitation



The filter becomes damaged, allowing contaminants to enter the circuit.

(2) Different welds on the outer steel



Imprecise welding

Genuine; Continuous weld



Imitation: Spot weld



● Genuine parts

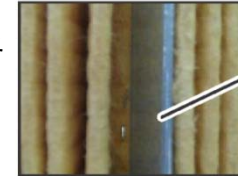


(3) Filter paper is stapled or stitched.

Imitation

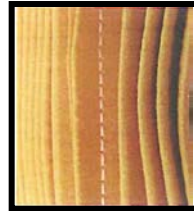


Filter



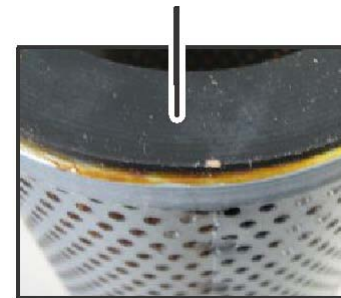
Stapled

Imitation



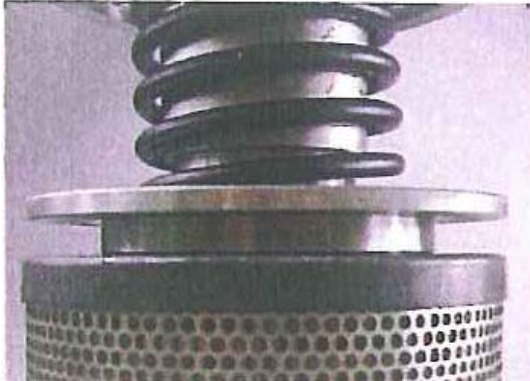
Staples may enter the hydraulic circuit, and stitched seams may be penetrated by dust

- Poor machining of packing at opening



Oil leakage occurs due to the packing machining.

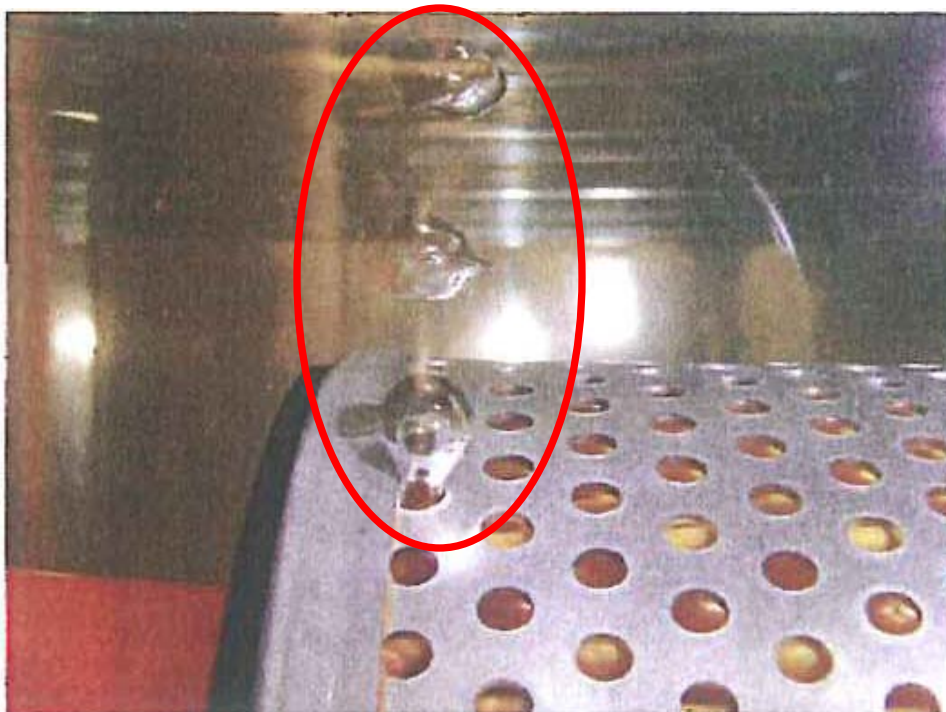
● Imitation filter example



Insufficient length results in a poor fit, preventing the filter from functioning correctly.



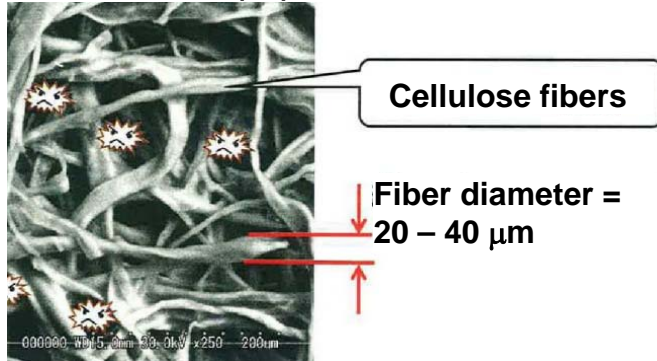
Genuine part



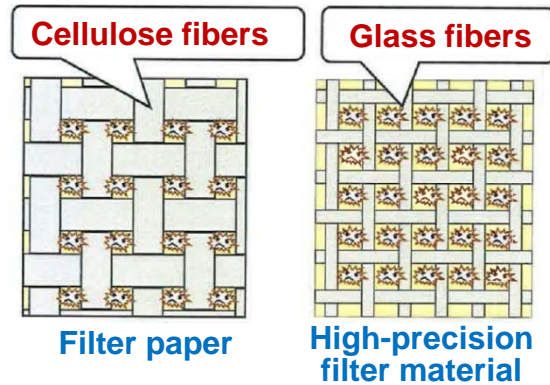
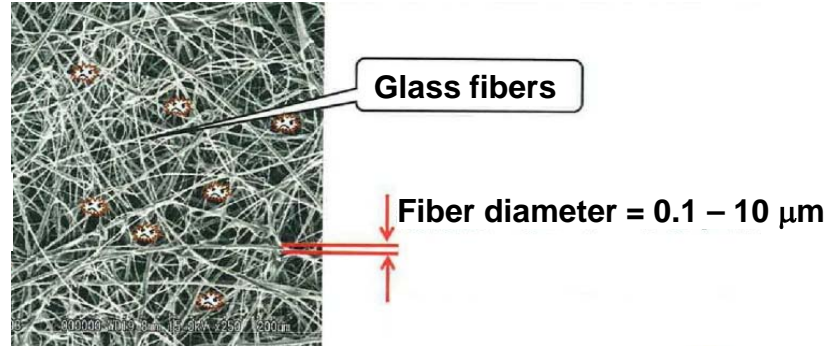
When the element is inserted into the tank, bubbles occur even at low pressure. These bubbles can also cause cavitation.

● Characteristics of a glass fiber filter

Conventional paper filter



Glass fiber filter



The glass fiber filter has a smaller fiber diameter, resulting in a larger effective filtering surface area.

- Able to trap more tiny dust particles.
- Reduces pressure loss.

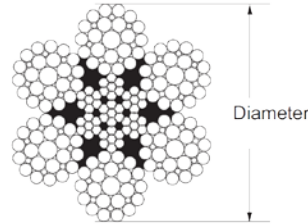
Cellulose fibers deteriorate simply by immersion in hydraulic oil. If they are used longer than the manufacturer's designated replacement interval, the cellulose itself can enter the hydraulic circuit.

On the other hand, glass fibers undergo almost no deterioration when immersed in hydraulic oil. In order to trap tiny dust particles, they have a larger filtering surface area than cellulose and the replacement intervals are twice as long as those of cellulose fiber filters.

4. Wire ropes

Even if the diameter and configuration are the same, a genuine TADANO wire rope **may differ from the market products in the following points.**

- (1) Wire class
- (2) Diameter tolerance
- (3) Torque and/or length of lay



(1) Wire class

The wire class is a rank of the nominal tensile strength of the wires that make up the rope.

The ordinary classes in the market are the following.

Class E: 135 kgf/mm² (1320 N/mm²) grade, bare

Class G: 150 kgf/mm² (1470 N/mm²) grade, plated

Class A: 165 kgf/mm² (1620 N/mm²) grade, bare or cold processed after plating

Class B: 180 kgf/mm² (1770 N/mm²) grade, bare or cold processed after plating

In addition, there is the **special class (designated class, Class C) category: 195 kgf/mm² (1910 N/mm²) grade or higher.**

These are products that were developed jointly by a manufacturer of construction machinery or elevators and a rope manufacturer. In general the ordinary sale of these products is prohibited by an agreement between the manufacturers at the time of development. Many TADANO products use special class (designated class, Class C) wire ropes.

Maximum allowable load (breaking load): Market parts < Genuine parts

In the worst case, an accident may occur due to breakage of the wire rope.

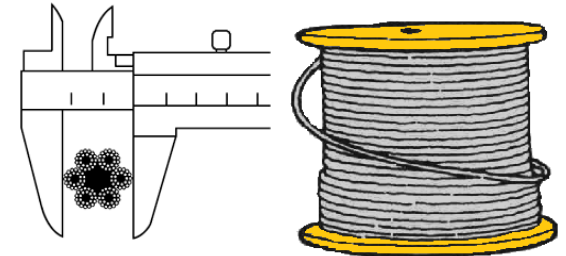
(2) Rope diameter tolerance

In order to prevent disorderly winding, layer digging, and other problems on the winch drum, TADANO studies the optimal rope diameter for the winch drum pitch and sheave, and decides the diameter tolerance range.

The greatest enemies of rope lifetime are disorderly winding and layer digging.



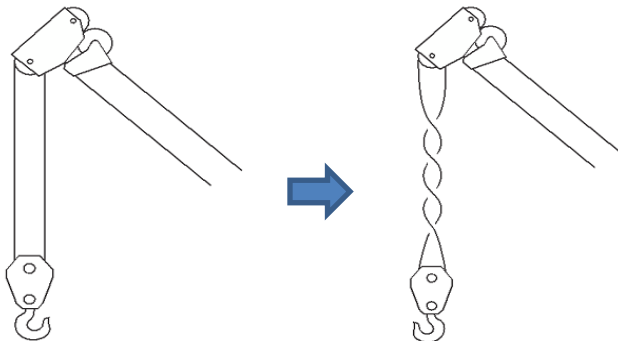
Countermeasure: Reduce the tolerance to prevent disorderly winding and layer digging.



(3) Torque and length of lay

Smaller winch drum → More layers → Entanglement occurs during high lifting height work. →

→ Use a rope which reduces torsion by torque control.



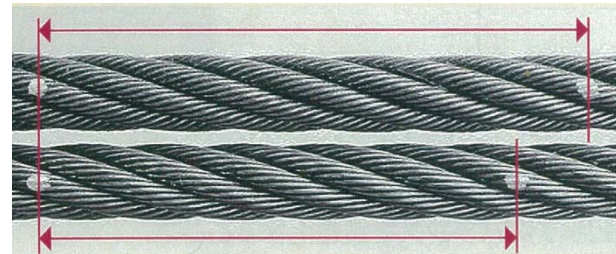
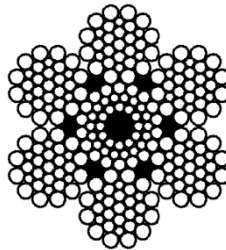
Entanglement

- Non-rotating rope (Nuflex)
P·S(19)+39



- Rotation-resistant rope (Rota-less)
SeS(48)+6 × WS(31)

Strand pitch: Short
Rope pitch: Long



Rota-less
Ordinary

5-1. Hydraulic oil

The hydraulic oil in a crane is like the blood in a human body. Even if the blood becomes contaminated, the person does not quickly become ill, but his condition continues to get worse as time progresses. Then by the time he recognizes the problem, he has high blood pressure and diabetes.

Although an extreme example, if you have blood type AB and you needed transfusion, would you request a transfusion of blood type A? Of course not.

Consider what happens if you will replace the hydraulic oil in the tank with aftermarket oil. Although you replaced the oil, in fact you did not replace all of it (see Table 1). Some of the genuine hydraulic oil (non-zinc type) which was added at the time of manufacture remains in the hydraulic components, hoses and pipes, and circuit. When the crane is operated after the oil replacement, the genuine oil and aftermarket oil become mixed.



Table 1: Amounts of remaining oil when hydraulic oil is replaced

Amount of hydraulic oil (L)	GR-120N-2	GR-130N-1	GR-160N-2	GR-160N-3	GR-250N-2	GR-250N-3	GR-600N-2 GR-700N-1
Tank	172	149	293	260	380	335	620
Total oil	240	220	400	366	510	463	930
Remaining oil	68	71	107	106	130	128	310
% remaining	28.3%	32.2%	26.8%	29.0%	25.5%	27.6%	33.3%

Replacement of genuine hydraulic oil LL
AC/RC/TC: Every 4 years
Aerial/TM: Every 2 years

(1) If the aftermarket hydraulic oil is a zinc type, significant sludge will be produced.

Note 1: Sludge refers to precipitated oil components, corrosion, and other substances (contaminants).

In addition, TADANO genuine hydraulic oil uses special additives in order to achieve the following.

- Matching with the oil seal material (Oiliness improver to prevent cylinder squeal)
- Passing winch brake and slewing brake performance tests (Friction modifier for wet clutches)

(2) Mixing with aftermarket oil decreases the concentrations of these additives, and may reduce performance and result in unexpected trouble caused by chemical reactions.

From a different perspective, oil manufacturers do not offer their technologies at bargain prices. Dealers do not sell for below cost.

Therefore the reasons that cheap oils are inexpensive may include the following.

- Low grade of the base oil
- Different type, quality, or amount of additives

(3) View cheap oil with a suspicious eye.

Using cheap hydraulic oil have an unexpected effect inside the hydraulic devices (pumps, motors, valves, etc.). Cheap oil is certain to cause wear of hydraulic devices. By the time you notice it, it is already too late. Because hydraulic oil functions in locations which are not visible, it is difficult to determine the actual conditions.

Table 2: Additives in genuine hydraulic oil LL

Hyd. oil Additive	Tadano genuine	46A	46X
Anti-wear agent	●	●	●
Antioxidant	●	●	●
Corrosion inhibitor	●	●	●
Anti-foaming agent	●	●	●
Demulsifier	●	●	●
Pour point depressant	●	●	●
Viscosity index improver	●	—	●
Oiliness improver	● Cylinder squeal countermeasure	▲ (Detergent dispersant)	▲ (Detergent dispersant)
Friction modifier	● For wet clutch	—	—
Detergent dispersant	-	●	●



5-2. Grease

TNR: Previously, the boom grease used for construction cranes and aerial platforms consisted of mineral oil + lithium (yellow)



1984: Molybdenum (black) is added as a means of preventing stick slip.



1995: Bentonite (black) is added to further improve stick slip characteristics.



2004: TNR (blue), a combination of synthetic oil + mineral oil + lithium that improves flowability at low temperatures



TNR-C: This boom grease for cargo cranes consists of mineral oil + lithium + molybdenum (black).
It is grease that delivers a high cost-performance.



TNF: Boom grease for super-large cranes consists of mineral oil + lithium + molybdenum + bentonite + fluorine (black).

Advantages: High viscosity, effective against harsh stick slip.
Long-lasting.

Disadvantages: High viscosity at normal temp. Lower workability when applying.



6. Brake pads

Three important factors to consider when selecting genuine parts:

- [1] Stability of the coefficient of friction
- [2] Heat characteristics
- [3] Compatibility of pad and rotor

} The harmony of these three factors is important.

Verifying [1] stability of the coefficient of friction and [2] heat characteristics

[Test conditions]

First effect: before running in

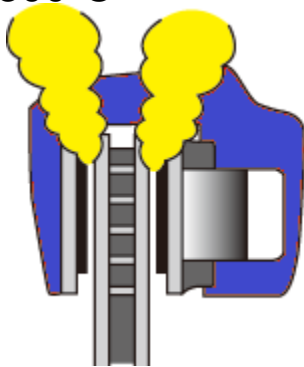
Second effect: Three patterns after running in (brake applied six times each)

First fade and recovery: brake applied 10 times at 60 km/h \Rightarrow brake applied 15 times at 120°C

Second fade and recovery: brake applied 15 times at 60 km/h \Rightarrow brake applied 15 times at 120°C

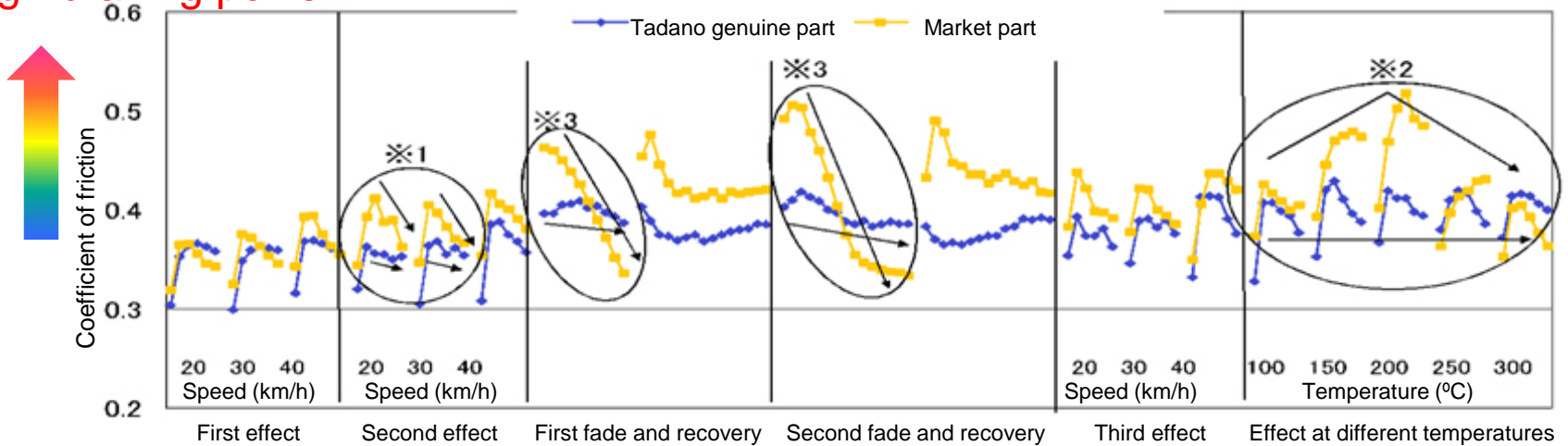
Third effect: After thermal history

Effect at different temperatures: brake applied five times at 100°C, 150°C, 200°C, 250°C and 300°C



Brake fade – a phenomenon where the braking power is reduced because the brake pad friction material (resin) starts to vaporize when it exceeds a certain temperature. The gas produced through the vaporization exists between the pad and rotor, and greatly reduces the coefficient of friction.

High braking power



Graph 1: Braking comparison

The ambient temperature (maximum temperature) during normal braking:

- When traveling in urban areas: approx. 200°C
- When braking often at high speed or down a slope: approx. 300°C

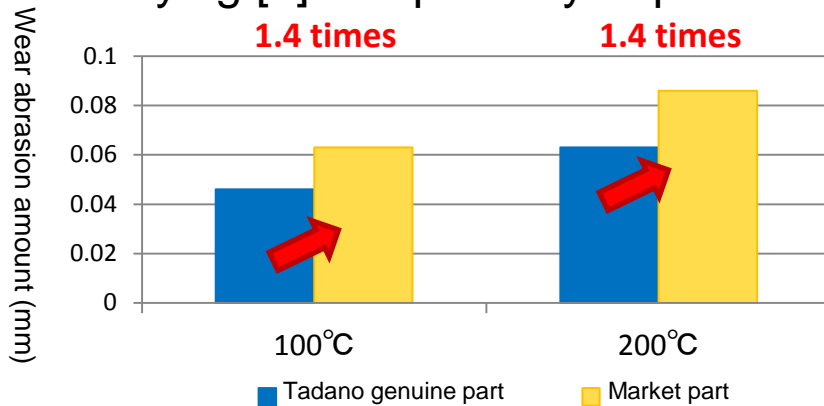
From Graph 1

- The market part has a higher braking power. = Brakes work well.
- The genuine part is better at deceleration changes. (*1)
- The genuine part is better at temperature changes. (*2)
- The coefficient of friction is greatly reduced especially during fade. (*3)

Conclusion:

Higher braking power \Rightarrow Temperature rise \Rightarrow Results in reduced braking power.

Verifying [3] compatibility of pad and rotor



Graph 2: Pad wear abrasion amount

Conclusion:

The pad wear abrasion amount is greater with the market part.

The wear abrasion amount of the market part is 1.4 times more than that of the genuine part.

⇒ Replacement interval is shorter.

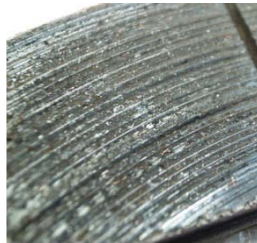
[Various pad conditions]

Carbonized



Pad ≪ rotor

Looks like a record

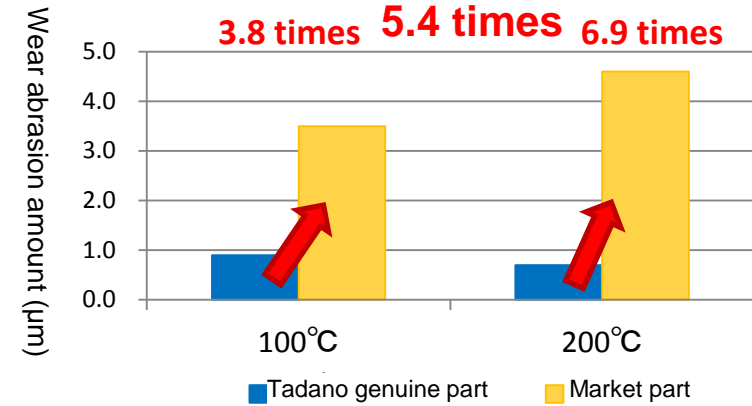


Pad > rotor

Over specs



Suitable condition (ideal)



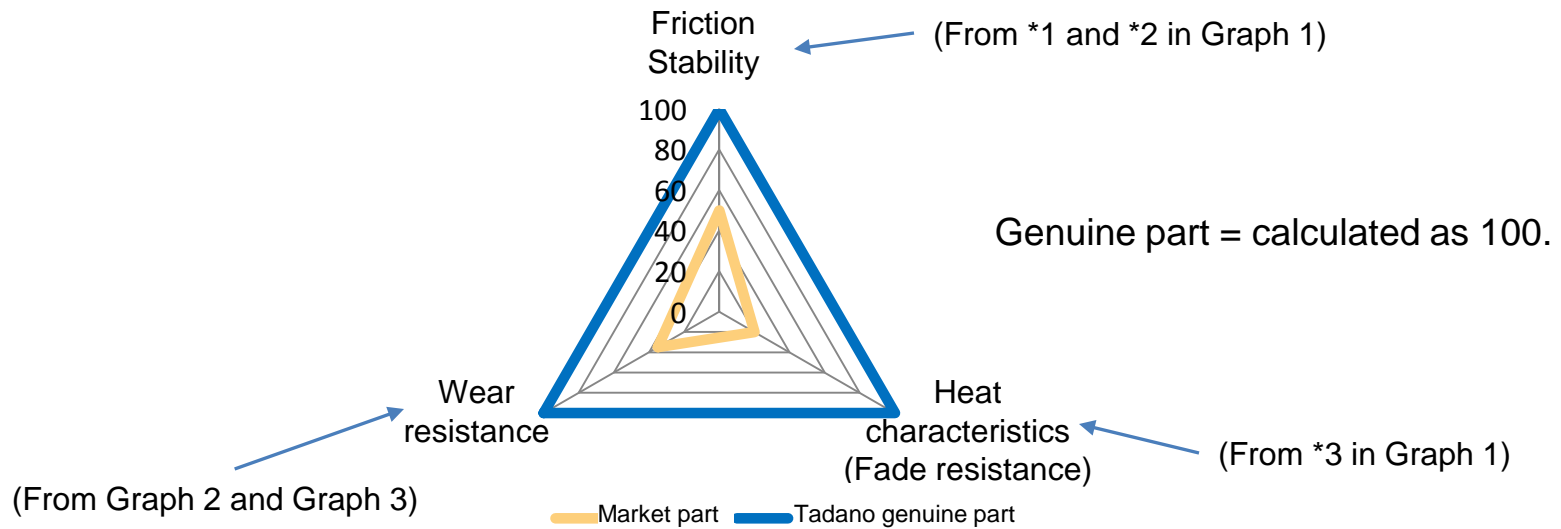
Graph 3: Rotor wear abrasion amount

Conclusion:

With the market part pad, the genuine rotor wear abrasion amount is 5.4 times more.

(70 ton: approx. 115,000 JPY, 13 ton: approx. 57,000 JPY)

[Overall evaluation of genuine parts and market parts]



Genuine parts are designed with considering the consistency of the friction stability, heat characteristics and wear resistance in addition to the selection of shapes and materials with a high heat dissipation capacity for the pads and rotors.

Features of genuine parts:

- [1] Reducing the change in the coefficient of friction as much as possible, and keeping a stable braking feeling (= stable braking)
- [2] A product that aims to reduce the pad and rotor wear abrasion amount, and increase the life of the part.

7. Summary

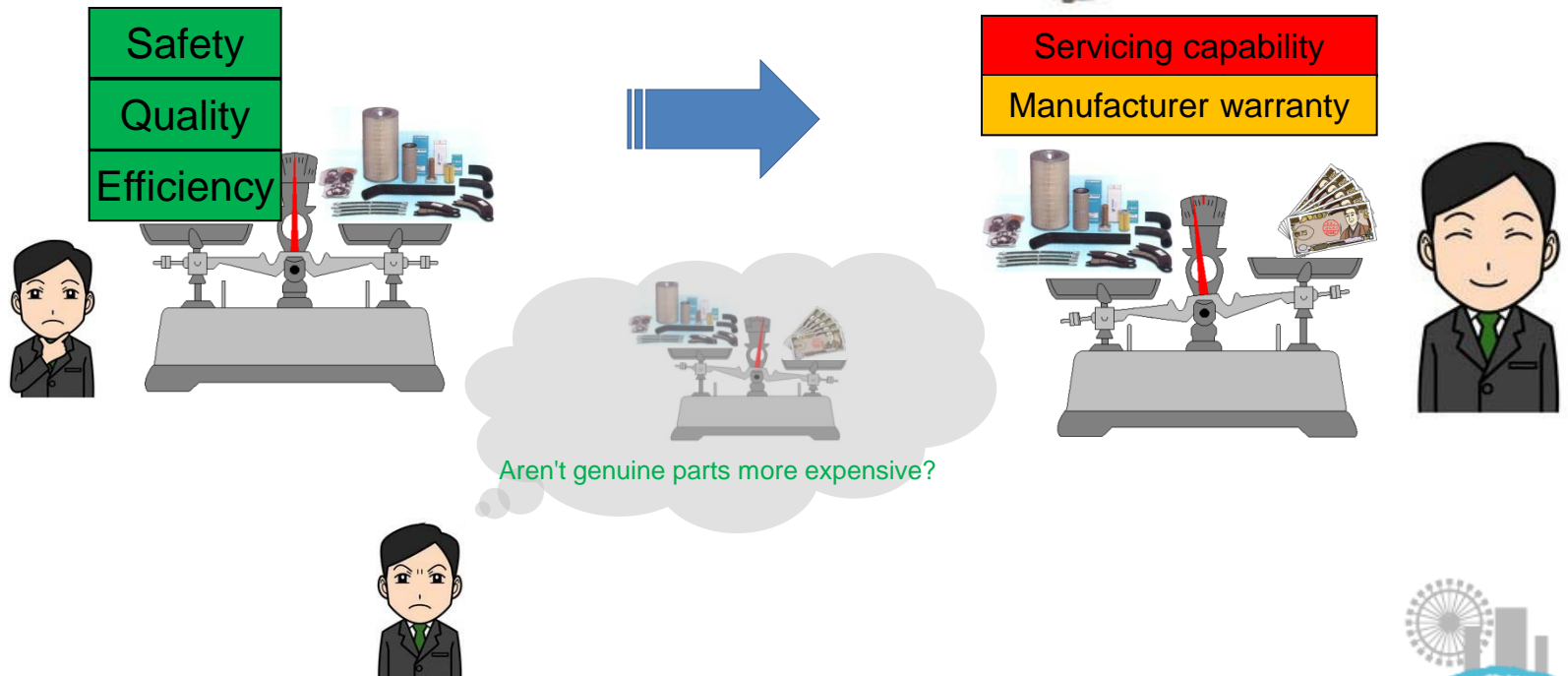
Advantages of using genuine parts

- Improve operating time.
- Maintain original durability and value.
- Maximize performance.
- Reduce life cycle costs.

➡ Safety (dependability)

➡ Quality  **TADANO core value**
Core value: Value of the brand

➡ Efficiency



8. Conclusion

About TADANO genuine parts

TADANO always provides high-quality machines, parts, and servicing that contribute to our customers' profits. TADANO genuine parts are designed and manufactured so that our products can deliver maximum performance. They are excellent parts that deliver high durability and quality, and have passed strict inspections based on top-class quality management.

When TADANO genuine parts are used in combination with our products, they extend the product lifetime and reduce running costs. Consequently they increase cost performance and contribute to improved safety and environment-friendliness in a broad range of work environments.

The global servicing parts market is overflowing with imitation and counterfeit parts, and reports of serious damage have been received from all parts of the world. In some cases, it is extremely difficult to determine that a part is not a genuine part from its appearance, including its package and label.

We understand that it is an important responsibility of the manufacturer to alleviate customer concerns regarding imitation and counterfeit parts, and have created a genuine parts label as one activity aimed at allowing our customers to feel secure in their use of genuine parts.

The best choice for building trust with the customers is to promote the importance of **periodic replacement** using **genuine parts**. Let's work together to expand the TADANO core value!

