

Cooock – Cirkel

Case book

The positive leverages of remanufacturing



Cases

- We started the list of positive leverages based on the cases in this casebook.
- Only in a second phase we added insight from research.
 - We indicate with icons the leverages we only find in literature but not (yet) in the cases.



Research

For manufacturer: Why remanufacturing?



- Gain insights to improve future designs:
 -  About wear of components
 -  In how the customers use the product
 -  Validation of design assumptions
 -  To comply to stricter regulations on sustainability
- Business
 -  Reach new customers
 -  Additional and complementary business models (BM)
 - Product as a Service, buy back option,...
 - One BM might provide input value for an other BM within the company
 -  Better, stronger customer relationship

For manufacturer: Why remanufacturing? – 2

-  Reduced ecological footprint
-  Access to spare parts of out phased products
-  Upgrade the product to a smart IoT device
-  Disclose new markets
-  New customer segments focussing: low cost products, lead time critical, indirect cost related to product architecture changes, carbon footprint reduction,...
-  Creates local, sustainable jobs
-  Might helps to find motivated employees (employer branding)
-  Pro-active knowledge and experience building enabling to comply easier with upcoming (EU) legislation (This is an assumption)

Why buy remanufactured product?

- 40% to 60% cheaper than new product
- Lower Total Cost of Ownership (if upgraded product)
- A-brand at lower price (stand by, none core applications, start up,...)
- Shorter lead time in case of breakdown
- Access to products/components that are no longer available via regular supply channels

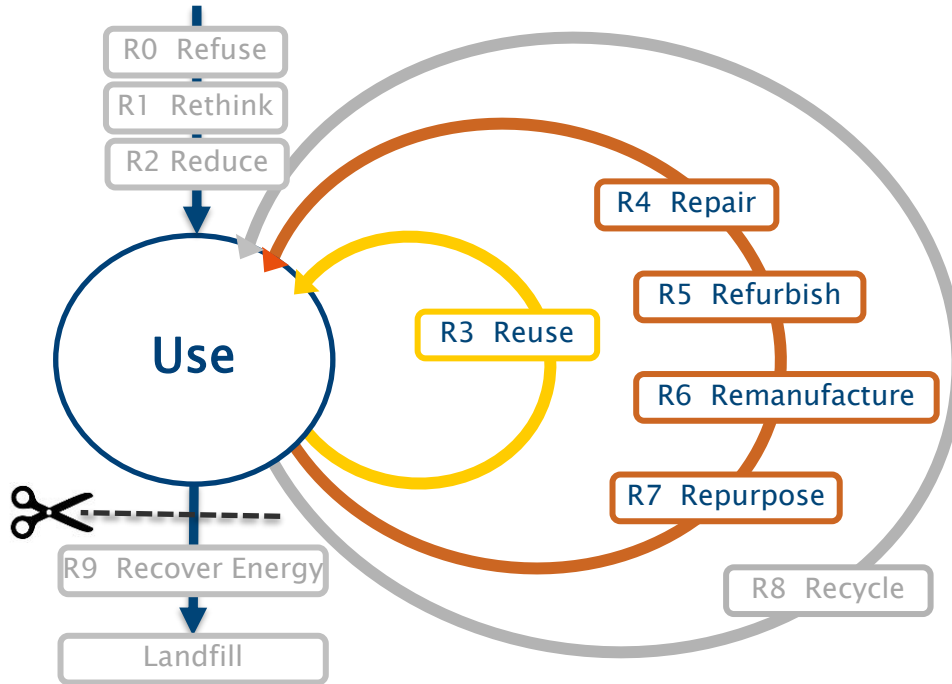
Why buy remanufactured product? – 2

- Improved quality of remanufactured product
- Life extension for custom products
- Waste reduction (if manufacturer buys back)
- Reduced ecological footprint

Lots of flavours, differences and opportunities



“R-strategies” in scope of this project



- R3 Reuse
- R4 Repair
- R5 Refurbish
- R6 Remanufacture
- R7 Repurpose

Illustrative and inspiring cases

- Cases are put in random order
- It is the intension to:
 - Provide a broad view on the type of products, activities, drivers,...
 - Stimulate reflection on your companies potential in terms of: products, market, business model, operational capabilities
 - Show that lots of successes exist, encouraging you to take action



18.000 automatic gearboxes per year for almost all car brands
Complete remanufacturing of the gearbox.

Advantage for customer:

- +/- 60% of the cost for a new one

Advantage for AW Europe

- Insights in reason why gearbox fails, stops working → design input for HQ in Japan

Remanufactured transmission versus new

Material use	99% less
Energy use	86% less
CO2	61% less

- **Retrofit of lamp cinema projectors to laser type:**
 - Customer gets up-to-date technology
 - Lowering down time & energy consumption @customer
- **In saturated market potential for sustainable business development**





- First circular economy factory dedicated to mobility in France
 - Target: negative CO₂ balance in 2030
 - > 3.000 jobs by 2030
- 4 activities
 - RE-TROFIT: extending the lifecycle of vehicles
 - RE-ENERGY: production, storage & management of green energies
 - RE-CYCLE: optimizing resource management
 - RE-START: promote innovation and knowledge sharing



- Mobile mining machinery
- Drop N Swap™ System
 - Choose to have your hydraulic cylinder or component
 - Repaired
 - Exchange it for a newly refurbished piece
 - Buy new
 - Minimise downtime by on site 'swap'



- Product repair
- Product reconditioning
 - Taking back of valuable products/components
 - SST units / components
 - Recovery of components (motors, fans, gear boxes,...)
- Product upgrades
 - New additional functionality

Gearbox remanufacturing services from SKF

Make your gearbox perform as new – or even better



Services for Amarillo Gearboxes



AGS Replacement Parts for
Marley™ Gearboxes



Amarillo Gear Renewal Services



Amarillo Renewal Services for
Marley™ Drives

- Repair of metal shafts, gears,... by means of laser cladding
- Life time extension, repair
- Additional local hardness adjustment according to needs/sensitivity to abrasion

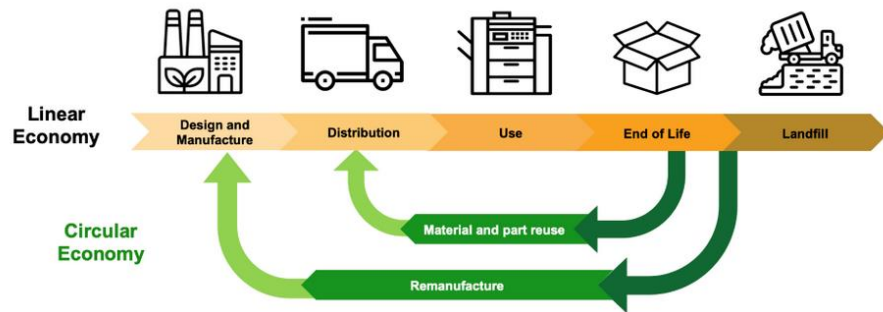


■ Cartridge collection

- In 2020, through the efforts of Lexmark customers, nearly 40 percent of the total toner cartridges shipped worldwide were returned through the LCCP.

■ Extending material life

- In 2020, 72 percent of the cartridges and supplies returned to Lexmark were reused. We have established a goal to increase this to 80 percent by 2025.





■ Global Remanufacturing Initiatives

- > 250 different product types in reman portfolio
- for passenger cars, commercial vehicles and off-highway applications
- 1.800 dedicated to reman in 25 locations worldwide
- Reduced CO₂ emissions in 2020 by 12.444 tons and energy savings of 8.740 MWh

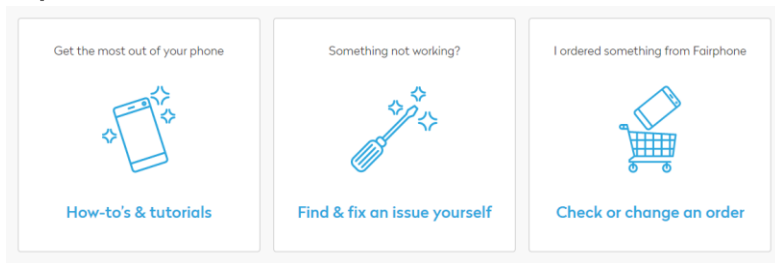
■ Collecting

- Fairphone 'Gift Card'



■ Repair & Recycling

- Repair policy and Service centers supporting the end users to extend product life
- In 2020, we managed to recycle over 17.000 phones



- **Circular design / Re-use, remanufacturing & re-sale**
 - Eco-design of all its offers by incorporating key dimensions of circularity for each new product development (e.g. lifespan, repairability, upgradability, ability to be retrofitted or dismantled, recyclability of components, etc.);
 - Promotion of its ecoFIT™ services, which consists of retrofitting Schneider Electric products and those of other brands. These services help to return equipment to its optimum performance thus extending its lifespan.

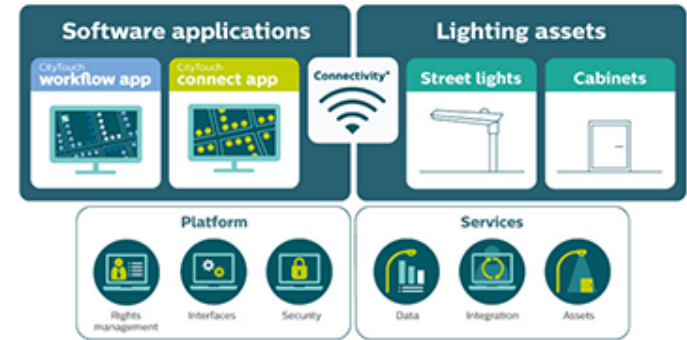


- Avoid value leakage throughout the value chain
- Ensure maximum usage of parts
- Parts and installation accessories collected after any installation, de-installation, repair or maintenance service
- **Parts harvested cleaned and tested to ensure quality as new parts**
- Strong infrastructure for trade-in equipment, planning and logistics in place
- Collaboration across functional organizations and businesses
- Design for recyclability (EcoDesign approach)



■ Maintenance & repair/Re-use

- Philips 'City Touch' can track products and parts installed at customer sites, facilitating maintenance services.
- Philips 'City Touch' can monitor the use cycles of individual luminaires and their constituent parts. This information could be used to optimize the recovery of products and components at the end of the use phase.



NEW

REMANUFACTURED

SAME WARRANTY

TOP QUALITY

UP TO 50% CHEAPER

SHOP ONLINE

RECONDITIONED & SECOND-HAND PARTS

Reconditioned Recycled Reliable GENERAL INFO ABOUT RECONDITIONED PARTS	ELECTRONIC & ELECTRICAL PARTS	HYDRAULIC CONTROL VALVES & PARTS
HYDROSTATIC AXLES & PARTS	INTERNAL COMBUSTION ENGINES & PARTS	DIESEL INJECTION PUMPS
AUTOMATIC TRANSMISSIONS, TORQUE CONVERTERS, GEARBOXES & PARTS	ELECTRICAL MOTORS & PARTS	STEERING AXLES, STEERING UNITS, ORBITROLS & PARTS

WHAT OUR CUSTOMERS ARE SAYING

"TVH offers a good quality of repaired parts, with a big difference in price compared to new parts."

Repair shop (Čavle, Croatia)

"Remanufactured parts are the cheapest option. On top, we're really satisfied with the availability at TVH and the overall quality."

Trader & repair shop (Janoshalma, Hungary)

"The price, fast delivery, large stock and online shop are the best thing about TVH's remanufactured parts. We've been partners for 30 years now, with many years to come!"

Trader & repair shop (Moers, Germany)

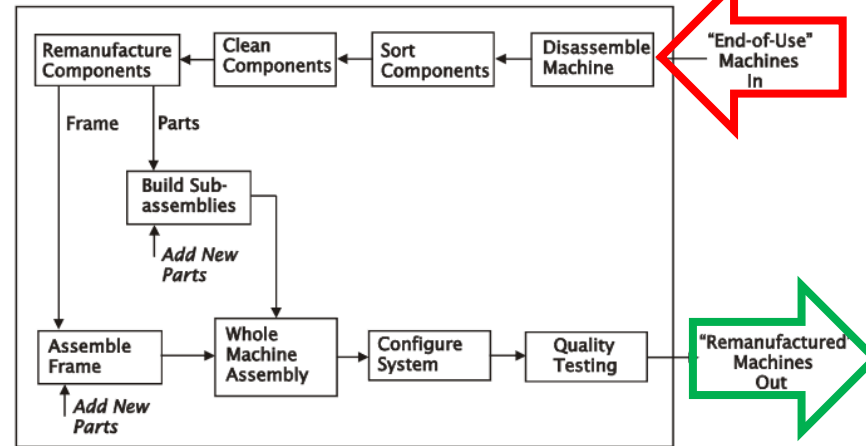
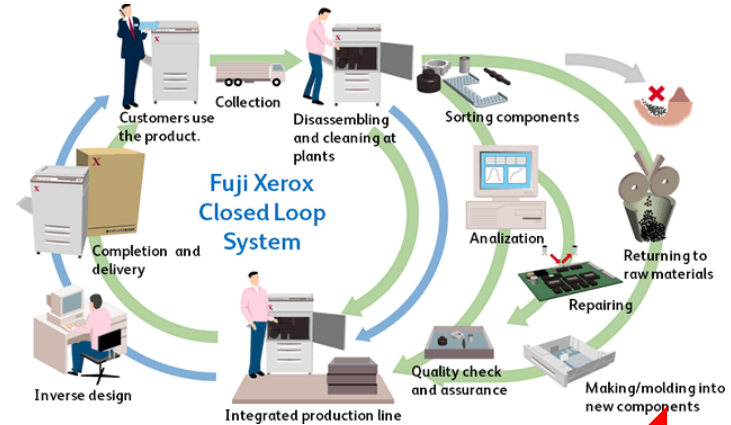
"After working with TVH for many years, we can say that the large stock, short delivery times and competitive prices are the biggest advantages of their remanufactured parts."

Repair shop (Castellón, Spain)

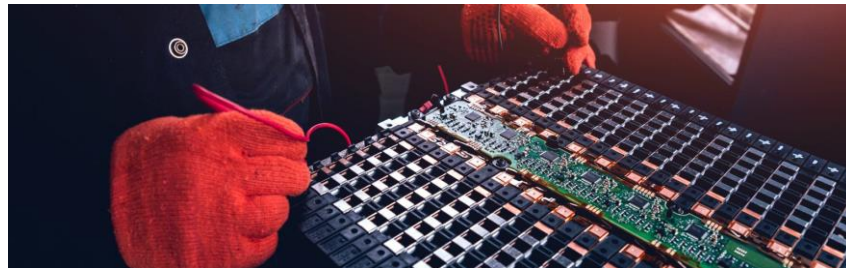
UNIQUE RANGE OF REMANUFACTURED PARTS

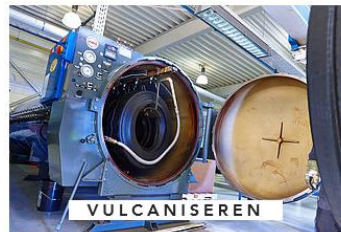
At TVH, you'll find a wide range of remanufactured parts for every machine: from the **smallest earth-moving equipment** machine to the heaviest **forklift**. Our unique range of remanufactured parts includes:

- Product as a service / Re-use, remanufacturing & resale
 - Xerox transformed into a **services led technology company focused on customer value**. 70% of Xerox's revenues are now created after the product sale.
 - All Xerox equipment – no matter the percentage of new and reused parts – meets the same quality specifications for performance, appearance and reliability.
- Enabling digital technologies
 - Xerox added **sensors** on the photoreceptor drum, feeder output tray, and toner cartridge to enable accurate billing and facilitate the sale of consumables like paper and toner.
 - So-called **signature analysis** technology determines the noise, heat and vibration properties (the “signature”) of the part to be reused to confirm that it falls in the range characteristic of a “new” part during operation.



- Reuse of car battery modules for energy storage application
 - Battery Diagnostic / Energy Need Audit
 - Dismantling Reusable or End-of-Life Batteries
 - Monitoring & Optimization of the Battery System
 - Ensure Responsible Battery Recycling
 - Battery Repair and Remanufacturing
 - Deliver Turn-Key Battery Solutions
 - Maintenance
- Energy optimisation solutions

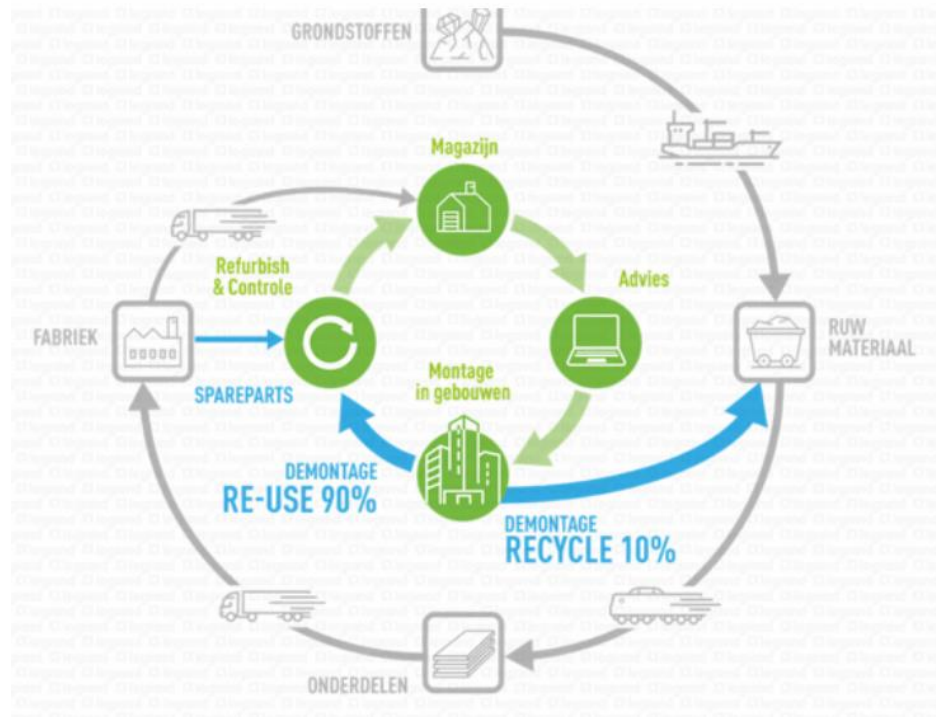


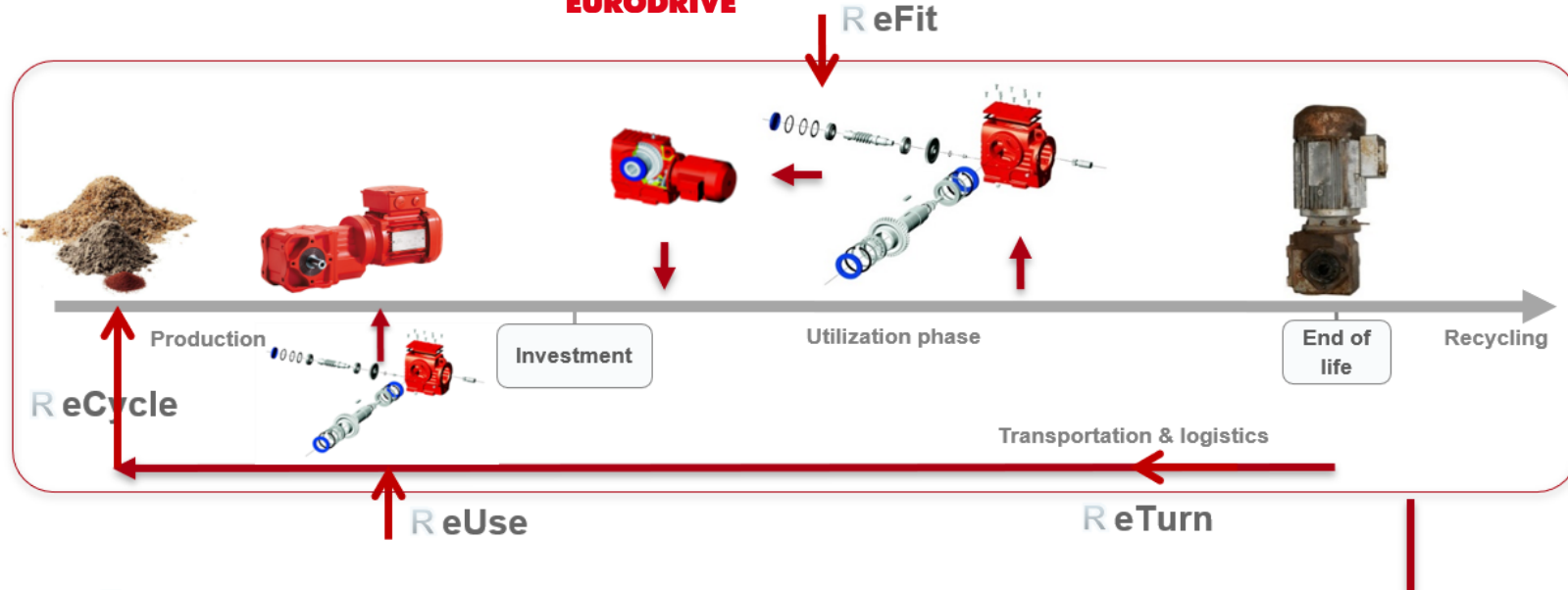


- Tread renewal
- Lower cost than a new set of tyres
- Repair of (expensive) large tyres



- A circular solution based on busbars (also known as voltage rails).
- **Buy-back agreement**
 - At the end of the period of use, Legrand will be informed.
 - Then we will harvest the system or the branch box, after which an amount will be refunded. The amount of this refund depends on the condition of the products.

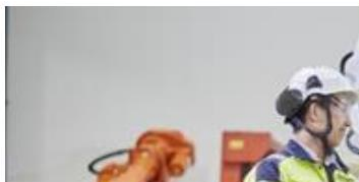




4R =

- **ReFit:** Customized adaption
- **ReTurn:** Returning the used components
- **ReUse:** Remanufacturing - “refurbish as new”
- **ReCycle:** Recycling not reused parts (bolts, bearings, oil, etc.)

- Robot global remanufacture and Repair Centre
- ABB has remanufactured over 12 000 robots during the last 25 years. ABB always offers a wide selection of more than 400 used robots on stock.



Remanufactured Robots



Remanufactured Customer
Robot Property



Remanufactured Arm
Exchange



IRC5 Controller Upgrade



Workshop Repair



Refurbishment /
Reconditioning Services



Buy Back

- Complete overhaul of old compressors
- New customer segments
 - Customers with little capital to invest who want A brand
 - Back-up compressor
 - Customers urgently in need of a compressor (4 weeks)
- Remanufacturing facilitated through modular design
- Gaining insight in use phase via IoT:
 - Compressors are equipped with Smartlink, Atlas Copco's data monitoring system.
 - It gives customers remote insight in their compressed air installation, helping to spot developing problems and showing them the potential for optimization and energy savings. Hence, lowering the TCO for the customer.
 - It helps Atlas Copco improve the design of new compressors.
- Gaining insight in wear and tear of compressors out of real-life examples
 - Insight in effective use profiles
 - Sales to new markets
 - Additional income



- Repair, overhaul and sales of hydraulic installations from small, standard cylinders, pumps and valves to very large and complex models from different brands.
- Stock of hydraulic pumps, motors and valves
- Qualified service center for specific brands



- Remanufacture already used calipers and manufacture new ones.
- Caliper spare parts program (> 2.400 part numbers), online catalogue
- Large stock allowing to assure short lead time for broad range of products

SAVING RESOURCES

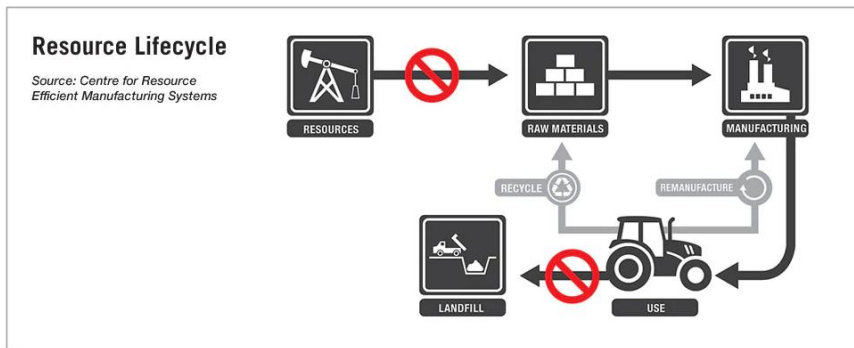
The use of remanufactured products is not only an affordable choice, it can save valuable resources and helps to protect the environment, too. The waste water from the cleaning process of the calipers, for example, is recycled in a closed system, thus saving resources.



- Remanufactured gearboxes and transfer cases.
 - specialized in remanufacturing transmissions for more than 30 years.
- Rebuilding a transmission involves replacing broken, defective, or worn-out parts with new ones.
 - Only replacing some internal components will create uneven wear and tear in the rebuilt unit. It is not simply rebuild them by replacing some parts , it is **expertly remanufacture transmissions**
- Many times, remanufactured transmissions are **superior to new factory gearboxes**.
 - Reman Transmission also provides a 5-year Hassle-Free unlimited mileage Warranty with every remanufactured gearbox sold.
- Meticulously **test** every part of every remanufactured transmission before shipping.



- In-depth testing of remanufactured engines and components
- Long warranty period on parts and labor (12..24 months)



- Remanufacturing on lathes, milling and grinding machines
- In the last 25 years, Storebro has reconditioned more than 800–900 machine tools.
- An estimated cost saving of 50 % or more compared to new machine
- Large stock of parts for manual machines (> 80.000 item lines, 1 mio parts in total)



- Industrial robots from Adept, Bosch and Stäubli
- Service, maintenance, repair and overhaul



24/7 ON-SITE EMERGENCY REPAIR FOR
INDUSTRIAL ROBOTS MADE BY ADEPT,
BOSCH AND STÄUBLI



ON-SITE MAINTENANCE FOR ROBOTS
MADE BY ADEPT, BOSCH, STÄUBLI



INDIVIDUAL RETROFITTING OF YOUR
INDUSTRIAL ROBOTS



REPAIR PACKAGES FOR INDUSTRIAL
ROBOTS MADE BY ADEPT, BOSCH,
STÄUBLI



TRAINING COURSES FOR ROBOT
SYSTEMS ADEPT, BOSCH, STÄUBLI



PURCHASE OF USED INDUSTRIAL
ROBOTS MADE BY ADEPT, BOSCH OR
STÄUBLI

- Office furniture provider
- How to furnish the office?
 - Remain, Redistribute, Repair, Refurbish, Repurpose, Recycle
- Majority of desks are retrieved from customers through a buy-back scheme which provides an economic incentive to return the product
- With these services, Desko offers **three price points** for customers
 - newly manufactured at approximately €920,
 - remanufactured once at around €460,
 - and remanufactured twice at approximately €230.



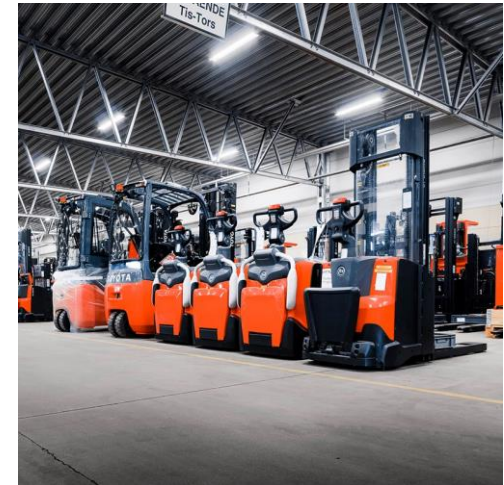
Toyota forklifts

TOYOTA

MATERIAL HANDLING

Refurbish

- Forklift manufacturer
- 'Approved Used Trucks '
- Process:
 - Inspect → Wash → Test → Paint → End inspection
- 30% of sold forklifts are Used Trucks
- Main reasons for customers:
 - Reduced cost, immediate delivery and reliable back-up
 - Warranty always included



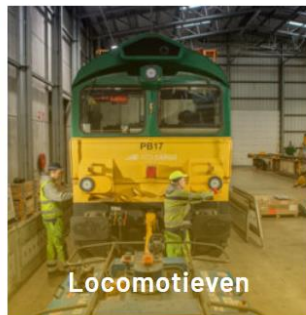
- Industrial laundry machines
- New and reconditioned washers, dryers and ironers
- From A-brands Miele, Electrolux
- Continuously > 100 industrial washers and dryers on stock
- Webshop for overview and to order



- Online platform
- Market place for vendors to sell refurbished electronic devices
 - Smart phones, tablets, kitchen appliances, TV& home cinema, DIY,...
- Since 2014, inception in France
- Available in 13 countries in 2021 and host > 1.000 sellers of renewed electronics
- New sellers need to be certified with the 'Black Label' that allows them to trade on the platform
- Offer 1-year warranty for all items



- Maintenance and repair of railcars and locomotives
- Already more then 20 years active
- > 300 locomotives per year, overhaul 3.000 wheelsets per year
- Flexibility, 24/7. Repair on the spot by mobile team





sirris

driving industry by technology



<http://www.sirris.be>



<http://techniline.sirris.be>



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