

# Waste Tyres Case Study

## Remoulds and Retreads: the re-use of tyres for cars and light trucks



<b>Product:</b>	Remoulded and retreaded tyres
<b>Material:</b>	Waste whole tyres
<b>Application:</b>	Re-use as tyres
<b>Project Type:</b>	Remanufacture
<b>Location:</b>	National
<b>Date:</b>	2006
<b>Specification:</b>	Car and light truck tyres can be remanufactured to extend their life performance. The remanufacturing processes provide for remoulding as well as retreading.

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## Overview

It is estimated that about 34 million tyres are scrapped annually in the UK: the recovery rate for potential tyre remanufacturing is about 20%, of which only 17% of the recovered units are suitable for processing.

During the period between 2001 and 2004, the combined car and light trucks sector has seen a contraction of about 21% in the number of units remanufactured. However, if the total demand by tonnage is considered, this fall is reduced to about 15%. Meanwhile the average weight of remanufactured car tyres has increased from about 6.5kg per tyre to about 7.1kg as the number of units per tonne fell from 154 to 141.

Combining data provided by the National Statistics Office (NSO) and the DTI, it can be estimated that in 2004/5 the total market value for UK-remanufactured car and light truck tyres was just over £11million.

Despite the relatively low market penetration of remanufactured tyres, their potential market impact remains high. One of the major issues relating to their use is that user perception of remanufactured tyres is one of second rate quality. In fact remanufactured tyres in the UK are as good as new, as they must comply with standards that equate to those imposed on new tyres.

One of the major vehicle sectors that use remanufactured tyres is the taxi market. Even here many operators only put remoulded tyres on the rear of the vehicle because it is perceived that those on the front do not last very long. In reality, the major problem with front tyres, especially in taxis with tight turning circles, is they are put under high shear stresses that cause the tyre tread to prematurely fail. Furthermore, where the vehicle is driven by diesel, there is a heavier loading on the front axle than the rear, so earlier failure would be expected. These issues are not restricted to remanufactured tyres, but are common to all.

Using remanufactured tyres can offer significant savings in operating costs, raw materials and the environmental impact of the vulcanised rubber tyre.

Financial savings are made by increasing the product's life expectancy by 50% or more, whilst incurring remanufacturing costs of only half that normally associated with tyre manufacture. By re-using the tyre carcasses, the amount of raw material consumed in its remanufacture is decreased by about two thirds. Further significant savings of about 75% are made in energy conservation during the remanufacturing operation.

Finally, remanufacturing tyres results in a significant delay in the ultimate end-of-life disposal. In many cases, tyres can be remanufactured multiple times, thereby saving on both energy and raw materials with each product recycle.

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## Technical Information

Description	Units
Estimated UK market value for remanufactured tyres (2005)	£11.3m
Total domestic demand (2004) for remanufactured car and light truck tyres	1.1 million units
Oil equivalence / new car tyre	31.5 litres
Oil equivalence / remanufactured car tyre	11.25 litres

## Background

The opportunity for re-using waste vulcanised rubber tyres is potentially very attractive as the possible savings in both energy and raw materials are very significant. The tyre remanufacturing industry can be broadly divided into two sectors, that of cars and light trucks and that of commercial vehicles. There is also a demand for remanufactured tyres in the aircraft and agricultural industries.

The UK domestic industry for remanufacturing tyres is dominated by the commercial vehicle sector, where about 950,000 units, with a total weight of 46.6 tonnes, were manufactured in 2004. In comparison, the cars sector produced a comparable 990,000 units, but with an accumulated weight of only 1,400 tonnes. Between these two sectors lies the demand for remanufactured tyres suitable for use on light trucks, namely vehicles with an axle weight of less than 3.5 tonnes. These represent a much smaller market, with only 108,000 units, but an accumulated tonnage of slightly less than 1,200 tonnes. The overall volumes for the domestic remanufacturing industry for tyres is summarised in Table 1 below.

**Table 1: A summary of tyre remanufacturing by the UK industry**

	2004		2003		2002		2001	
	Units (000s)	Tonnes (000s)						
<b>Cars</b>	988	1.4	1,067	7.1	1,124	7.3	1,238	8.0
<b>Light Trucks</b>	108	1.2	116	1.3	134	1.5	151	1.6
<b>Commercial Vehicles</b>	952	46.6	880	43.1	892	43.7	806	39.5
<b>Total retreads</b>	2,049	49.2	2,063	51.5	2,150	52.5	2,195	49.2

Source: Oakdene Hollins Ltd compilation/DTI (UTWG) /WRAP

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Table 1 summarises the total volume and weight of remanufactured tyres produced by UK manufacturers and includes exports but not imports. Recently released figures<sup>1</sup> for 2004 estimate the total domestic market demand for remanufactured tyres was in excess of 1.6 million units, with the majority (814,500) being used by commercial vehicles and trucks. However a significant number of units were used by cars and light trucks, where about 593,000 and 108,500 were used respectively. The volume of remanufactured tyres produced for cars and light trucks has shown a decline over recent years, whilst the demand for commercial vehicles has shown a growth. In 2004 the number of car tyre units was similar to that for commercial vehicles, but the total tonnages for commercial vehicles is about 30 times that for cars; this is due to the large difference in the size of the respective tyre units.

A case study specifically relating to the re-use of waste tyres by the commercial vehicle sector has already been published by WRAP<sup>2</sup>: this study will only consider the market for cars and light trucks.

The total domestic manufacturing volume for remanufactured car and light truck tyres comprises domestic consumption and exports, and is summarised in Table 2, where it can be seen that the industry is showing a modest and gradual decrease in volumes from 1.4 million units in 2001 to 1.1 million in 2004; the industry has also suffered a corresponding decrease in tonnages.

**Table 2: The total manufacturing size of car and light truck tyres by the UK domestic industry.**

	2004		2003		2002		2001	
	Units (000s)	Tonnes (000s)						
Car (Export)	395	2.8	434	2.8	401	2.6	296	1.9
Car (UK)	593	4.2	633	4.3	723	4.7	942	6.1
Light Truck (Export)	108	1.2	4	0.04	4	0.04	4	0.04
Light Trucks (UK)			112	1.2	130	1.4	146	1.6
<b>Total</b>	<b>1,096</b>	<b>8.2</b>	<b>1,183</b>	<b>8.4</b>	<b>1,258</b>	<b>8.8</b>	<b>1,389</b>	<b>9.7</b>

Source: DTI (UTWG) /WRAP

To achieve a remanufacturing level of 1.1 million tyre units, it is estimated that about 6.5 million tyres are inspected for suitability. However, it is estimated that about 34 million tyres are scrapped annually in the UK, so the recovery rate for potential tyre

<sup>1</sup> [www.wrap.org.uk/downloads/utwg04\\_new\\_basis\\_final.1d071bb3.xls](http://www.wrap.org.uk/downloads/utwg04_new_basis_final.1d071bb3.xls); DTI/WRAP data

<sup>2</sup> [www.wrap.org.uk/downloads/TYR008\\_Biffa\\_Retreaded\\_Tyres\\_Case\\_Study\\_Final.89663b65.pdf](http://www.wrap.org.uk/downloads/TYR008_Biffa_Retreaded_Tyres_Case_Study_Final.89663b65.pdf)

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remanufacturing is about 20%, of which only 17% of the recovered units are suitable for processing.

During the period between 2001 and 2004, the combined car and light trucks sector has seen a contraction of about 21%. The light truck sector has suffered a less severe decline of about 12% for the same period, but the dominance of the car sector is such that the overall business sector has seen a fall of 21% in the number of units remanufactured. However, if the total demand by tonnage is considered, this fall is reduced to about 15%.

Since 2001, when over 940,000 domestically manufactured car tyre units were sold, the UK's total demand for domestically remanufactured car tyres has seen a continued decline and by 2004 this demand had fallen to less than 600,000, representing a decline of over one third in domestic demand. This loss of domestic market has resulted in the total volume of remanufactured car tyres produced in the UK falling below 1,000,000 units for the first time this century. Unfortunately this decline has been mirrored in the domestic demand for remanufactured light truck tyres, where a fall of slightly less than 30% has been experienced.

The export market for remanufactured car tyres has shown a general increase in volumes, except for 2004, when a decline in volume, coupled with a lesser fall in tonnage, was suffered. The export market for light truck tyres is believed to be stable at about 4,000 units. The export market for remanufactured tyres has become of increasing importance to the industry over recent years; in 2001 only about 24% of the total remanufactured car tyres were exported, but this increased to about 36% in 2002, whilst during 2003 and 2004 it represented about 40% of the total manufactured capacity. The export demand for light truck remanufactured tyres has also increased in percentage terms, but remained relatively constant in the number of units, reflecting the gradual decline in domestic demand for remoulded truck tyres.

The average weight of remanufactured car tyres has also increased, as shown in Table 3, where it can be seen that between 2001 and 2003, the number of tyre units per tonne for exported car tyres was about 154; this is equivalent to about 6.5kg per tyre, but in 2004 this weight increased to about 7.1kg as the number of units per tonne fell to 141. This trend towards heavier remanufactured car tyres is better shown in the domestic supply market, where in 2001 and 2002 the average weight was again about 6.5kg, but in 2003 it increased to 6.8kg, to have another increase to the current 7.1kg in 2004. These increases can be accounted for by the increase in demand for larger MPV vehicles and off-the-road vehicles such as 4X4 cars.

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**Table 3: Average number of units per tonne**

	2004	2003	2002	2001
<b>Car (Export)</b>	141	154	154	154
<b>Car (UK)</b>	141	147	154	154
<b>Light Truck (Export)</b>	92	93	93	93
<b>Light Trucks (UK)</b>		92	92	92

Source: Oakdene Hollins Ltd/ DTI (UTWG) /WRAP

There are no reliable industry generated figures for the import of remanufactured light truck tyres, but the industry considers the volume to be negligible, with virtually the whole market being taken by cars and vans. In 2004 this volume was a minimal 50,000 units, compared with over 91,000 units in 2001. This represents a decline of about 45% compared with 2001, but the number of units is insignificant to the total domestic demand. The import market is summarised in Table 4.

**Table 4: Imports of retreaded tyres**

	2004		2003		2002		2001	
	Units	Tonnes	Units	Tonnes	Units	Tonnes	Units	Tonnes
<b>Car and van</b>	50,986	362	55,846	363	89,231	580	91,538	595

Source: DTI (UTWG) /WRAP

A summary of the total domestic demand for remanufactured tyres for cars, vans and light trucks is shown in Table 5.

**Table 5: The total domestic demand for remanufactured car and light truck tyres, 2001-2004**

	2004		2003		2002		2001	
	Units (000s)	Tonnes (000s)						
<b>Car</b>	593	4.2	633	4.3	723	4.7	942	6.1
<b>Light Trucks</b>	108	1.2	116	1.3	134	1.5	151	1.6
<b>Imports (cars&amp;vans)</b>	51	0.4	56	0.4	89	0.6	92	0.6
<b>Total</b>	<b>753</b>	<b>5.8</b>	<b>804</b>	<b>5.9</b>	<b>947</b>	<b>6.7</b>	<b>1,184</b>	<b>8.3</b>

Source: DTI (UTWG) /WRAP

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When reviewed as percentage unit market share, as shown in Table 6, it is clear that the market volume is dominated by car tyres, but the market by weight has a significantly higher penetration level by light trucks, as would be expected because of their larger tyre sizes.

**Table 6: The total domestic demand for remanufactured car and light truck tyres, 2001-2004, by percentage**

	2004		2003		2002		2001	
	Units	Tonnes	Units	Tonnes	Units	Tonnes	Units	Tonnes
<b>Car</b>	79	72	79	73	77	70	80	73
<b>Light Trucks</b>	14	20	14	21	14	22	13	20
<b>Imports (cars&amp;vans)</b>	7	8	7	6	9	8	7	7
<b>Total</b>	<b>100</b>							

Source: DTI (UTWG) /WRAP

According to the DTI data given in Tables 1-6, in 2004 there were about 700,000 remanufactured tyres used on cars and light trucks in the UK, of which about 600,000 were on cars, the overall market penetration for the product is relatively low. For comparison, it is estimated that remanufacturing industry for tyres suitable for use on cars and light trucks has a market share of only about 4% of all tyres sold, compared with about 50% for heavier trucks and buses. Furthermore, the aviation industry also extensively uses remanufactured tyres: it is widely believed that all major airlines use retreads on their fleets and that about 90% of all tyres on aeroplanes are retreaded.

It is worthy of note that data available from the National Statistics Office suggests a slightly different profile for the manufacture and use of retreaded tyres suitable for use on cars in the UK. The differences are due to a slight difference in methods of data collection, but in general the figures shown in Table 7 are broadly comparable with those in Table 2, although there are some exceptions, such as the total domestic manufacture and net supply.

**Table 7: UK domestic demand for retreaded car tyres by volume (units)**

	2005	2004	2003	2002
<b>UK manufacture</b>	717,208	807,043	865,315	1,024,769
<b>Total exports</b>	257,051	316,518	296,809	307,144
<b>Total imports</b>	36,396	29,274	44,426	75,460
<b>Net balance</b>	-220,655	-287,244	-252,383	-231,684
<b>UK net supply</b>	496,553	519,799	612,932	793,085

Source: Statistics Office PRA 25120 (2005)

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Furthermore, the value of this market can be quantified, as given in Table 8:

**Table 8: UK domestic demand for retreaded car tyre by value (£m)**

	2005	2004	2003	2002
<b>UK manufacture</b>	9.213	9.357	9.340	10.619
<b>Total exports</b>	3.446	3.424	2.817	3.497
<b>Total imports</b>	0.424	0.246	0.312	0.666
<b>Net balance</b>	-3.022	-3.178	-2.505	-2.831
<b>UK net supply</b>	6.191	6.179	6.835	7.788

Source: Statistics Office PRA 25120 (2005)

If the data provided by the NSO is factored in with that of the DTI in Tables 1-6, it can be estimated that in 2004 the total market value for remanufactured car and light truck tyres manufactured in the UK was about £11.5million, but in 2005 it fell by about £200,000. However, during 2005, the net domestic demand for remanufactured tyres increased in value by about £10,000, despite an estimated fall in demand of 27,000 units to 566,000.

The market profile for the availability and use across the UK of remanufactured tyres for cars is highly regionalised, with market demand predominating in the north of England. Furthermore, the price of remanufactured car tyres also varies regionally, with higher prices being charged in the south of England, thereby reducing their competitiveness. The range of remanufactured tyres that can be used on cars is also tightly restricted in the UK, where it is legal to use retreaded tyres, but regrooved tyres are illegal.

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## Specification, Quality Assurance and Manufacture

The term “remanufactured” is generic and refers to tyres that have been processed and rebuilt to make them “fit-for-purpose” for an extended period after their original operational lifetime has expired. Such reconstructed tyres are often colloquially known as “retreads” or “remoulds” and these terms are often loosely interchanged, but the industry has much more stringent and specific terminology for their products. Such terms are quite specific in their meanings and are also associated with very specific end-uses, so it is worthwhile considering the technology of remanufacturing vulcanised rubber tyres in relation to the final end-user, as there is a direct relationship between the specification, quality assurance and manufacture for both the remanufacturing route and the product’s end-user. Currently the more favoured colloquialism for remanufactured tyres is “retreaded”.

“Retreading” is a sub-category of tyre remanufacturing and the term encompasses two specific remanufacturing techniques, namely those of ‘pre-cured retreads’ and ‘mould cured retreads’. Pre-cured retreads are manufactured at a lower temperature and are more commonly known as ‘retreads’, whilst mould cured retreads require a higher temperature to vulcanise the rubber and are more commonly known as ‘remoulds’. For the purpose of this report, the generic term ‘retread’ or its derivatives will be used to encompass both processes unless otherwise specifically stated.

### Tyre specification

The purpose of regulations relating to the remanufacture of tyres is to ensure they have the same quality standards as those expected of new tyres and thereby ensure their safety and performances to an acceptable level; since 1<sup>st</sup> January 2004 the compliance of remanufactured tyres has been the same as for new tyres. EU legislation now requires that all tyres must pass ‘type approval tests’, which involves passing endurance tests, commonly called drum tests, at their nominated speed rating. For new tyres, these requirements are covered in Regulations ECE 30 for passenger vehicles and ECE 54 for commercial vehicles. In the case of remanufactured tyres these regulations are now met by ECE 108 for car tyres and ECE 109 for commercial vehicle tyres. Prior to 2004, all remanufactured tyres were manufactured to the requirements given in the British Standard BS au 144 series.

### Initial tyre inspections to assure quality

Tyres are one of the most important components on any vehicle and are a critical feature in its operating safety. Consequently, it is essential that they are fit for purpose. The engineering structure of modern tyres is complex and has evolved over recent decades to improve both their safety performance and ability to withstand the higher demands put on them by modern cars, so very sophisticated techniques must be employed to ensure any tyre being considered for remanufacturing is fit for purpose. Furthermore, the tyre must be of the right size for the processor’s market, as although the majority of tyres are of standard sizes, there are some that are specific for a very limited market.

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As already mentioned, retreaded (or remanufactured) tyres can be sub-categorised into both ‘pre-cured’ and ‘mould cured’ products. The term ‘retreaded’ tyre generally covers both pre-cure and mould cure products, but their processing route can determine their permissible final end-use. For instance, the UK does not allow pre-cured tyres to be used on passenger vehicles, so all tyres for this use are only mould cured when remanufactured. On the other hand, commercial vehicle tyres can be remanufactured both by “mould cure” and “pre-cure” retreading. According to the Retread Manufacturers Association (RMA), the production of mould cured remanufactured tyre units for cars and light trucks outstrips pre-cured tyres by a ratio of approximately 2:1. Both processes require the same inspection procedure and preparation processes.

Prior to being used for retreading, all tyres are thoroughly examined by the remanufacturing company. It is essential that the selected tyres are structurally sound and be of an inherent quality that they are suitable for remanufacturing, but such are the requirements demanded by the industry for sound feedstock that the RMA estimates about 80% of all tyres sent for reprocessing are unsuitable.

The majority of waste tyres collected in the UK are from cars, so, taking account of the RMA’s estimates on feedstock suitability, it is not unexpected that after examination, between 70 and 90% of all car tyres collected for recycling are considered unsuitable for retreading. This high percentage is partly because collection procedures to recover casings suitable for the specialist market are left to the industry, but also because significant numbers of new car tyres cannot be retreaded because the integrity of the tyre is not sufficient for this end-use. Such tyres are generally cheap imports.

For comparison, the rejection rate for heavier commercial vehicle tyres is estimated by the industry to be lower than for cars, at about 50%. This is in part due to the reputable manufacturers designing of tyres for use by commercial vehicles that have an element of remanufacture built into them. Coupled with this is the higher intrinsic value of the products in this market sector and the greater availability of fleet and tyre management services that actively promote such economic practises.



Source: Oakdene Hollins Ltd

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About 72% of the rejected car and light truck tyres are attributed to such extreme in-service damage that the tyre is beyond repair. A further 22% are rejected because of service repairs or casing integrity faults: of these about 64% are due to material failures making the casing unsuitable for further re-use as a tyre. Such tyres are used as feedstock for other tyre-rubber based products. Often they are shredded and crumbed or used as incinerator or cement kiln fuel, but numerous other applications are being developed as their disposal in landfill sites becomes prohibited.

Tyres that are potentially suited for remanufacture are inspected both manually and by X-rays to ensure the fabric and structure of the tyre is sound. Particular interest is paid towards the detection of manufacturing defects, non-repairable damage and excessive aging of the tyre fabric. Any faulty tyres are discarded to be destroyed by deconstruction or incineration.

The tyres are then subjected to further testing, such as tactile inspection, where component fractures and layer delamination can be detected. Ultrasonic testing of tyres can determine how the sound is transmitted through the tyre; damaged areas will absorb the sound and be identifiable from data scans: this technique is particularly suited to detecting internal damage to the structure of the tyre, such as delamination, that is not always visible by simple visual inspection.

Laser shearography is used to measure the shape changes of the tyre while under stress. This is usually used as a final inspection, but is also being considered as a pre-selection technique. When the tyre is not inflated and freestanding, the inherent stiffness of the rubber keeps the tyre in shape, but when the tyre is inflated and under load, it is the steel reinforcement bracing that maintains its shape. In a laser shearography test, the tyre is subjected to an internal laser scan when both at ambient pressure and under vacuum. Any asymmetry in its shape will be detected by comparing the scans and any gross distortion or fracture of the bracing will be easily identifiable.

## Tyre re-manufacture

Of the approximately 34 million tyres annually reaching their 'end-of-life' in the UK, only about 6 million, or 17%, are suitable for retreading; the remainder being either too damaged or being the wrong type of tyre.

Before any tyre can be re-manufactured by either mould curing or pre-cure techniques, the old tread is removed by "buffing". This is carried out by mounting the tyre on a lathe-type buffing machine, where the tyre is inflated and spun whilst a buffing rasp removes the worn tread and rendering the resulting new surface suitable for receiving a new tread. The process also ensures that the tyre is of the correct crown width, profile and radius. Rubber buffings are usually sold to rubber moulding companies for use in other products. Typical particles from the buffing process are about 1mm in diameter. Such is the quality of modern remanufactured tyres that in many cases the industry considers their tyres can be more true and round than the original tyres.

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Source: Oakdene Hollins Ltd

After the tyre carcass has been stripped of its old tread and buffed, any repairs to it can be made, as long as the damage is within stringent predefined limits.

After the tyre carcass has been repaired and thoroughly inspected for any other failings, it can be retreaded. This is carried out by using either a mould cure process or a precure process.

In the mould cure process, the new uncured tread is applied to the crown area of the buffed tyre and is closer to the process used to manufacture new tyres than is the pre-cure process. In the case of bead to bead retreading, new rubber can also be applied to the tyre's sidewalls. The casing is then rebuilt to the desired diameter with uncured rubber and then put into a mould where it is cured, or "vulcanised". During this vulcanising process, a complex chemical reaction takes place, in which the long molecular chains of the rubber are joined together by bridges, or "cross-linked", by much shorter chains of sulphur atoms.

After the mould is closed and the tyre body inflated to the correct pressure, the swelling of the casing conforms the uncured material to the mould, forming the new tread design. The mould is then heated under pressure to a predetermined temperature of between 150° and 180°C for the required time to complete the curing process. This creates a chemical bond between the old tyre carcass and the new tyre tread. Mould curing is normally only carried out by the larger retreading companies because of the high capital investment.

In the case of retreading by mould cure, uncured rubber is applied to the tread and sidewalls of the tyre, after which the tyre is cured in a mould in way similar to the manufacture of a new tyre. Since the newly moulded tread needs vulcanising, the tyre is processed under pressure at temperatures of about 150°-180°C.

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When a tyre is retreaded using the precure process, the buffed carcass is re-coated with a tread that has already been pre-moulded and precured by the manufacturer. A strip of the appropriate tread is selected for the tyre and is cushion gum bonded to the carcass. It is essential that this new tread is applied at in the correct orientation, otherwise the tread will not be aligned around the tyre. Once the new tread strip is in place, the tyre is true. The re-treaded tyre is then placed in the curing oven or autoclave where it is heated to a lower temperature of about 100°C for the required time, thereby allowing the cushion gum layer to cure and the new tread be firmly bonded to the old carcass. This process is preferred by smaller retread companies as it is less capital intensive.

It is claimed by companies operating the pre-curing process that the lower processing temperatures result in a lower degradation of the structure during processing, but others companies consider that this effect, if present, is only a marginal. Conversely, the hotter process offers the opportunity to reveal previously unseen hidden flaws in the tyre, which the cooler processing would not.

### End-user assurance

Despite the relatively low market penetration of remanufactured tyres, their potential market impact remains high. One of the major issues relating to their use is user perception of their efficacy. Road safety publicity stresses the importance of the interactions of the vehicle tyre and the road surface and how dangerous poorly maintained tyres can be. Furthermore, evidence of tyre disintegration on commercial vehicles is widespread, with discarded tyre tread being often seen alongside the roads; it is widely and often incorrectly assumed that this tread is from retreaded tyres, when it is often due to poor tyre maintenance. Consequently public perception of remanufactured tyres is one of second rate quality. In reality, this is not the case, since remanufactured tyres in the UK must comply with standards that equate to those imposed on new tyres.

One of the major vehicle sectors that use remanufactured tyres is the taxi market. However, even here many operators only put remoulded tyres on the rear of the vehicle because it is perceived that those on the front do not last very long. In reality, the major problem with front tyres, especially in taxis with tight turning circles, is they are put under high shear stresses that cause the tyre tread to prematurely fail. This is not restricted to remanufactured tyres, but to all products. Furthermore, where the vehicle is driven by diesel, there is a heavier loading on the front axle than the rear, so earlier failure would be expected.

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Source: Oakdene Hollins Ltd

The benefits of using remanufactured tyres could be easily promoted by actively promoting their use within the public sector, especially on Government cars and other vehicles. This could enhance the public's faith in the use of remanufactured tyres.

### Technical Benefits

Remanufactured tyres must be fit for purpose and as such there is no technical benefit in their use as far as the end product is concerned. The essential feature for all remanufactured tyres is that they achieve performance parity when compared against new tyres.

Despite there being no technical benefit in using remanufactured tyres, the remanufacturing industry is continuously striving to meet the demands of their end users. To this end, one domestic remanufacturer is currently marketing a self supporting tyre, better known as a "run-flat". Even if the tyre becomes punctured it will not fully deflate and thereby offers superior safety advantages over its more common deflatable counterpart.

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## Cost Benefits

Competition in the car and light truck tyre sector is fierce, with the prices of many imported tyres being comparable with those of remanufactured tyres. However, when compared against domestically manufactured tyres, the retail price of a remanufactured tyre can be between 50% and 65% that of a comparable new tyre, but both prices and availability are very regional.

There is apocryphal evidence to suggest remanufactured tyres do not perform as well as new tyres in respect to their longevity, but this has not been substantiated and it is worthy of note that despite a public perception that remanufactured tyres do not perform as well as new tyres, UK-based insurance actuaries working in the vehicle insurance sector do not discriminate against the use of retreaded tyres. There is therefore no increase in operating premiums due to their use, suggesting there is no reliable evidence to suggest remanufactured tyres are inferior to new units.

Not only are remanufactured tyres cheaper and are a better use of natural resources, but their use also delays their ultimate end of life and reduces the associated costs of disposal. The disposal of waste tyres is becoming more expensive and consequently it is becoming more attractive to remanufacture them. Once the tyre has reached its practical end of life, it now needs to be destroyed and this is done by either incineration or disassembly. Typical prices for shredded tyre material is about £100-140/tonne, making it a financially useful remanufactured product, especially when compared against incineration, where it is not unusual for the tyres to have a negative value.

## Environmental Benefits

Retreading tyres results in a prolonged active life for the tyre and delay in its disposal. A typical remanufactured tyre can have its life expectancy extended by a minimum of 50%, thereby reducing by about one third the number of waste tyres produced annually. Furthermore, the use of remanufactured car tyres saves, in total, the equivalent of 4.5 gallons of oil. A new tyre requires about 5 gallons of crude oil equivalent in raw materials and a further 2 gallons in energy, but when remanufactured, these figures fall to about 2 gallons and 0.5 gallons respectively.

# Waste Tyres Case Study

## Supply Chain

Remanufactured car and light truck tyres are manufactured by only a few companies in the UK. These companies are usually part of a larger group that specialises in the recovery and re-use of end of life tyres and have the infrastructure to arrange collections of larger volumes of feedstock material.

Feedstock material is sourced primarily from retail outlets, who charge the consumer for tyre disposal. The collected tyres are sorted at central sites and suitable tyres are retained for processing. However, the majority of collected tyres are not suitable for remanufacture and are reprocessed and converted into shred or crumb. This is either done within the confines of the processing company or the tyres are sold on to a specialist shredding company.

Once processed, remanufactured tyres are sold either by the manufacturing company or through a network of retail outlets. They can easily be purchased and they offer good performance, cost & sustainability benefits to purchasers, both public & private.

Further information is available from the Retread Manufacturers Association (RMA) and their Green Dealer Scheme:

Retread Manufacturers Association (RMA)  
PO Box 320  
Crewe  
Cheshire CW2 6WY

Tel: 01270 561014  
Fax: 01270 668801  
e-mail: [rma@greentyres.com](mailto:rma@greentyres.com)  
website: <http://www.retreaders.org.uk/>

The RMA Green Dealer Scheme  
website: <http://www.retreaders.org.uk/greentyre.htm>

This case study was developed for WRAP by  
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