Product Life Cycle: Car Tires
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Research and Product Development:
Tires are developed for specific purposes, such as off-roading or high performance. Most tires, however, are designed to provide maximum durability, fuel economy and ride comfort. Much research goes into creating composite materials that provide these characteristics.

Marketing:
Bridgestone Tires is one the most recognisable brands in the US, largely due to their highly successful advertising. Bridgestone has developed sponsorships with professional sports leagues such as the NFL, NHL and PGA. Bridgestone uses this strategy to build brand recognition, and has found it to be very effective.

Manufacturing:
The first step in producing a tire, other than mining and gathering the natural resources needed, are mixing the materials for production. There are over 200 ingredients present in a single tire. The components fall under five main groups: Natural rubber, synthetic rubber, carbon black and silica, metallic and textile reinforcement cables, and numerous chemical agents. These components are taken and expertly assembled through a hand-made and automated process.

The first stage in development is rolling the inner liner, which is an made out of an airtight layer of synthetic rubber. Next, the carcass layer is added. This layer is very important as it largely determines the strength of the tire. It is made up of thin textile fiber cords which are bonded into the rubber. A standard tire will typically contain 1440 of these chords, each capable of withstanding 33 pounds of pressure. Then the lower bead area, which is the part of the tire where the rubber grips the metal, is added to the tire. Next comes the beads themselves. The beads are what keeps the tires attached to the rim. Each one clamps down and ensures an airtight seal. Each wire can withstand an immense amount of resistance strength, and since their are eight of them on a car (two per tire) they can withstand a massive total of 31,746 pounds. Next the sidewall is added to the tire. These are a necessary component as they protect the side of the tire from impacts with curbs and the rode. Next the belts are added to the tire. Belts are made of a very fine steel chords which are bonded into the rubber. These largely determine the strength of the tire as well because it allows the tire to resist the forces of turning. This layer is flexible and allows the tire to absorb impacts caused by bumps and potholes on the road. Next the cap ply is added. Made out of nylon cords bonded with
the rubber, this layer serves to reduce heat from friction. Lastly, the tire is treaded. This allows for traction on the road and is designed to resist wear, absorption and heat.

**Packaging:** As for tires there isn’t much to packaging them, the majority of tires that are used in the U.S. come from third world countries such as the following: Italy, Spain, Canada, Chile, and Germany. More than likely most tires are put into containers without any packaging at all due to the fact that they are not delicate and very flexible. Being that they are flexible if the company were to package them not only would they be wasting money and resources however they couldn’t fit as many tires into the shipping container.

**Sales, Distribution and Transportation:**
As far as sales goes for tires it can be very tricky to pick out which tire fits your needs better. The price of a practical tire can range from anywhere to $45 to $520 per tire. Now however that seems like a large gap it’s not each tire fits its price, in a sense you get what you pay for. When you buy a cheaper set of tires they do not last as long and they are normally made out of a harder compound rubber. Every set of tires has a different use in the last few years companies have developed tires called run flats. Run flats have the ability to run for 50 miles after they have been punctured which is what makes them so expensive. For something like a sports car however these tires must be made out of a soft compound because they need maximum traction to grip the road. Distribution is much like any other product you buy them when you need them. Now that being said believe it or not most tires have a shelf life because just like a rubber band they lose elasticity and flexibility causing them to snap and blow up under pressure. Some tires however are distributed more often than others; this applies to special tires like mudding tires or studded tires. The reason being is not everyone needs them and if they sit on a shelf the tend to go bad so you have to specially order them. Tires are normally shipped in bulk from third world countries. First at the factory they are all stuffed into a container and then trucked to the nearest port. After getting to the port they are put onto a container ship on its way to the United States after this they are loaded back onto trucks and distributed to different wholesalers around the world.

**Consumer Use:**
Tires have a variable consumer life time. A common tire should be replaced when the tread wears out or when the tire is too old to function properly. Originally, carmakers such as Nissan and Mercedes-Benz recommend that tires should be replaced six years after their production date, regardless of tread life. However, depending on the use, a car tire can have a longer or shorter lifespan. A tire’s tread life will wear out in three to
four years when you drive a standard number of miles annually (about 12,000 to 15,000 miles each year). If the car isn’t driven constantly, the tire will need to be replaced with time. This is due to the fact that an old tire is similar to an old rubber band, meaning that it will snap or tear apart when used. Other manufacturers such as Continental and Michelin say a tire can last up to 10 years, provided you get annual tire inspections after the fifth year.

Final Disposition:
-Tires present many unique challenges when it comes to recycling. Tires are made from a variety of materials, and are heavy (commercial truck tires can weigh 120 lbs each). Tires have a 34% recycling rate. Many tires are used as an alternative fuel to coal, as they are lower cost and are slightly more efficient
-The United States has a large problem with tire disposal. It is estimated that 300 million tires are disposed of annually (one tire for every person in the US). Tires are not biodegradable, so they need to be recycled and repurposed rather than taking up a staggering about of acres in landfills. Thirty-eight states outright ban whole tires from landfills. Seas of tires exist in dumps around the globe, including in Hudson, CO, the world’s largest tire dump. Some recycling methods include converting tires into ground rubber or rubber shreds, which is used to create groundcover for playgrounds, backfill for civil engineering programs, garden mulch, erosion control barriers or drainage foundations around buildings. Car tires can also be ground and used as a new component in new highways.

Sources:


http://www.edmunds.com/car-care/how-old-and-dangerous-are-your-tires.html


http://beta.waste360.com/Recycling_And_Processing/scrap-tires