

Greener by design

End-of-life cars can only be entirely recycled with an integrated approach that starts on the drawing board, believes Auto Recycling Nederland's Kasper Zom...

The widespread introduction of vehicle scrapping schemes has focused international attention on car recycling. And rightly so, since an efficient recycling process is absolutely essential if end-of-life cars are to be processed and residual materials re-used in an environmentally-friendly way. With a current recycling rate of 85% of an end-of-life car's weight, the Netherlands is well on the way to reaching the target of 95% recycling by 2015 as specified in the EU directive. Unfortunately, there are still various obstacles standing in the way of the complete recycling of these vehicles. The causes are easy to identify, but solving them is more difficult.

Car recycling in Europe is governed by the principle of producer responsibility, as laid down in Directive 2000/53/EC. To enable vehicles to be recycled efficiently at the end of their useful life, car manufacturers are required to provide information about the 'recyclability' of a new vehicle when they seek an EU type-approval certificate for it. The procedure involves making a theoretical calculation based on the materials used and the available recycling methods: the 'theoretical recyclability'. This method of calculation has a significant drawback because the theoretical recycling percentage generally does not correspond with the actual recycling percentage, the 'practical recyclability'.

Theory versus practice

The gap between the 'theoretical recyclability' and the 'practical recyclability' is caused by the fact that manufacturers combine various materials, which are in themselves recyclable, in complex constructions that sometimes cannot be recycled, or at least not in an affordable manner. Design engineers have to juggle a range of often conflicting demands with respect to production, use, energy consumption, safety, legislation, the environment and recycling, illustrated by recent research into the 'recyclability' of dashboards in cars produced between 1992 and 2000. During this eight year period, the total weight of dashboards increased by more than 15%. At the same time, the number of components doubled, making dismantling them for recycling a time consuming and expensive process. Furthermore, dashboards often contain different types of plastic, and also have a sandwich structure that combines different materials in a way that makes them difficult or impossible to separate. Because of these factors, the 'practical

recyclability' is significantly smaller than is theoretically possible. Another example is the recycling of PVC, which is frequently used in cars as it is sturdy, scratch-proof and able to withstand ultra-violet rays and heat. Thanks to modern technologies, PVC can, in principle, be recycled as long as it is used in a pure enough form.

But here again, theory departs from practice. Modern PVC recycling methods cannot be used effectively, since the amount of PVC in the plastics fraction recovered from the shredder residue is very low. The shredder plastics fraction that contains the PVC is simply too diverse in materials. These examples show that the materials and constructions chosen by car manufacturers, however understandable they may be from a practical perspective, have major consequences for recycling.

Design for recycling

To meet the many demands placed on modern vehicles, by governments, environmental organisations and consumers, an integrated approach is crucial. Choices made in the design phase at the start of the development process can have far-reaching consequences for recycling at the end of the product's life-cycle. Car manufacturers increasingly need multidisciplinary design teams that can ensure an optimal design, construction and choice of materials with a view to recycling in the future. Recycling will become even more important as the emergence of hybrid and zero-emission vehicles leads to the elimination of much of the pollution caused while driving. It is important to bear that in mind in attempting to develop a car designed to minimise the adverse effects on people, the economy and the environment.



Kasper Zom
Project leader
Auto Recycling Nederland (ARN)
Tel: +31 20 66 131 91
kasper.zom@arn.nl
www.arn.nl

