A Comparison of American and Dutch Engineering Students' Views on Safety and Sustainability for Ultra-lightweight Vehicles

Authors:

M.L. Cummings, Massachusetts Institute of Technology, Cambridge, MA, missyc@mit.edu
Anke van Gorp, Delft University of Technology, Delft, Netherlands, a.c.vangorp@tbm.tudelft.nl

Abstract *— This paper reports on one of three international collaborations on engineering ethics supported by NSF award #0135585 t, which was the development of an ultra-lightweight vehicle ethics engineering ethics case that focused on potential ethical issues for safety and sustainability in design. The case focused on the efforts of a multidisciplinary design team consisting of undergraduate and graduate students from the Netherlands attempting to design a lightweight, sustainable car. In this paper we will present the ultra-lightweight vehicle case study, which focused on the possible design of a family car with a maximum mass of 400 kg, which is less than half of that of normal cars. This reduction in mass has generated a debate over safety concerns when building a lightweight car because heavier vehicles protect the driver and passengers in a collision, but are not as fuel efficient. We presented engineering students from both the Netherlands and the United States with questions about safety and sustainability for this case, and in this paper, we will discuss representative answers from both groups. These answers demonstrate the commonality of views between the two engineering cultures as well as the differences in attitudes towards safety and sustainability. From the results of this pilot study, a multimedia web-based engineering ethics case was developed that is available through the Online Ethics Center (www.onlineethics.org). This web-based case can be used to augment ethics and design instruction in engineering curricula. The online presentation details the ultra-lightweight vehicle design case, as well as the questions posed to the Dutch and American students concerning safety and sustainability, which could also be answered as part of a class assignment. In addition, on the web site, a comparison of the answers from the American and Dutch engineering students is presented to give insight into cultural similarities and differences, as well as to provide topics useful for classroom discussions.*

Index Terms *— engineering ethics, lightweight vehicle design, safety, sustainability*