The key to a quiet life…or death?

Peter Hancock

Peter Hancock is Provost Distinguished Research Professor and Pegasus Professor in the Department of Psychology and at the Institute for Simulation and Training at the University of Central Florida in Orlando, USA.

For most of the history of the modern automobile, the start function has been initiated by turning an ignition key which is typically carried on a keychain holding a bunch of keys that unlock many of the portals in our lives. Who, for example, has not experienced the dread and anxiety that goes along with 'losing' ones keys? However, the digital age has begun to chip away at the necessity of carrying pieces of small sculpted metal in our pockets or purses. Crucially, however, as the traditional key is phased out of our lives, many of the learned and ingrained behaviour patterns associated with the keys have not caught up with the change. There are dangers associated with one such keyless evolution, namely the operation of new 'keyless' vehicles.

Although commercial keyless vehicle systems have existed for more than a decade and a half, the move of our modern society toward all things digital has seen a vast expansion of this convenience feature. Most, if not all, of the major vehicle manufacturers worldwide now provide some form of keyless entry and ignition option on at least one, if not more, of their production models. Indeed, what was once reserved for one of the most luxurious models is now commonly found on midrange and lower cost vehicles. Individual characteristics of specific production systems tend to vary by manufacturer but some of the more broad operational and ergonomic principles apply across the whole spectrum of this new technology.

In general, electronic keyless systems are quite simple. Instead of a direct, metallic switch to initiate ignition, the process is now achieved by a fob which, when in range, sends a coded electronic signal to an engine control computer. If the code in the signal matches the code in the computer, a security system of some nature permits both entry to the vehicle and activation of a push button start switch. In this entry and activation mode, the new system acts very much like its metal forebear. While in motion, the question of engine activation is essentially moot. However, when the vehicle stops, it is now quite possible to inadvertently leave the vehicle running. You might argue that this is also possible with traditional, existing key systems and this is correct. However, we now have to consider the deeply ingrained habits of the user and the extended function of the traditional bunch of keys. Before leaving a vehicle, we're accustomed to shifting our gears into park if in an automatic, or out of gear if in a manual, and turning the key to the off position. Indeed, in an automatic, we couldn't remove the key unless we had shifted to park, so the key in the ignition lock acted as a failsafe to make sure we had properly shifted out of drive. Eliminating this customary step requires a fundamental change to our usual behaviour.

When you leave a vehicle, you often use your keys to lock it and to subsequently enter your residence or place of work. Thus, you often have to shut the engine off in order to move to the next phase of your day. Forgetting the metal key in the vehicle and leaving it running becomes highly unlikely when these subsequent tasks are now prevented from occurring. Thus, keys are not merely for opening and closing locks; they also act as an aide memoire in the performance of a sequence of everyday tasks. Consequently, the habit of turning the key and removing it has become ingrained; a behavioural pattern which simply and naturally flows after stopping our cars.

In previous generations of vehicles, leaving the car 'on' as you exit tends also to provide a series of visual, auditory and even tactile-kinesthetic cues as to its status. Old-time vehicles tended to make a considerable noise, their exhaust was often visible and the whole vehicle tended to vibrate noticeably while

the engine was on. Over the immediate past decades, designers and engineers have sought ways to reduce these sources of disturbance since they were perceived as being perhaps unpleasant. However, these nominally adverse effects contained problematic yet important informational content. Modern vehicles now rarely belch smoke from the exhaust. Efforts have also been very successful at reducing both noise and vibration such that modern vehicles have now indeed become whisper quiet. Vibration inhibition has been truly spectacular and is indeed used now as a prominent sales dimension. Often the only way to know if a vehicle is running is to look at the tachometer or touch the accelerator. When the modern driver exits the vehicle, the cues as to engine operational status (e.g., visual, auditory, tactile-kinesthetic, etc.) are so close to threshold that they are effectively masked (especially if any form of distraction is present in these respective sensory dimensions). This progressive evolution tends to make a mode awareness error quite likely. Without the stimulus of the traditional and learned key removal sequence which is now no longer required in keyless systems, you can well assume that the vehicle is 'off' when in reality it is continuing to run. The complaints to the National Highway Transportation Safety Administration (NHTSA) derived from the accounts of drivers and other news media observations suggest that this is a frequent occurrence.

As noted earlier, the strategy of differing manufacturers to warn drivers of this circumstance tends to be specific to each production model or line. What remains critical to emphasise here is that you need to either i) make the driver aware of the error or potential for error in this situation, and/or ii) provide an automated, vehicle-based capacity to turn the vehicle off when a specified period of inactivity has passed. The latter could well be embedded into the electronic vehicle control systems which detect and translate driver input such that a specified interval of no recorded activity would cause shut down similar to the 'sleep' function in many computers. Like all forms of design, these solutions partake of a trade-off. However, in this present trade, the issue of having to re-engage ignition is stacked against the potential of the error of omission.

It might, initially seem that leaving your engine running is more of an inconvenience than a significant threat. This is simply incorrect. The cases in the United States which have so far accrued from this form of design-induced error have been fatal. Locking your vehicle while it's in a public place is a common behaviour pattern and thus turning the engine off is accomplished on most occasions as part of this security function. However, when you have parked your own vehicle in an enclosed garage, the 'security of the vehicle' function (i.e., preventing the theft of the vehicle) and the 'engine turn off' function have now been largely dissociated. That is, closing your garage door may well be considered sufficient to protect the vehicle from theft and hence the electronic action of securing the vehicle, which also turns off the engine, may well be overlooked.

A vehicle 'running' in an enclosed space with direct access for the exhaust to the airflow into your house is indeed a deadly trap. Sadly, a number of individuals now appear to have fallen into that trap. One of the general lessons here is that reducing all forms of stress, that is, making life 'stress-less' by design, is not always a good thing. We need to be vigilant in understanding the various vectors of design and where good intentions can unfortunately take us. This example may be one of these adverse but unintentional design outcomes. ❖

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