

THE CONCEPT OF MODULARITY: THE TWO-PART CAR

by Gordon Dower

One hundred years of competitive industrial evolution have produced the modern automobile. Its design has reached such a mature state that year-to-year improvements are minor and more often due to gadgetry than significant advances. Suddenly, there is an urgent need for drastic change. The world's climate is telling us ever more forcefully that our planet simply cannot sustain the world's population of CO₂-emitting vehicles. The situation is so serious that, even if we stop all such emission, we may not be able to halt the progression of the world's climate toward a meta-stable equilibrium point that cannot support human life on the vast scale it now enjoys. Since our problems ultimately arise from over-population perhaps the situation will cure itself, but the process will be horrific. It would be vastly preferable to make drastic changes now rather than have them made for us by an offended and pitiless Mother Nature.

One of these drastic changes is to stop using fuel-burning cars—this includes hybrid electrics. Unfortunately, we won't do that because we have become so dependent on them, mentally as well as physically. We can generate electricity without putting CO₂ into the atmosphere, and we can switch to electric trains, buses, and autos, but the battery electric car needs to be both convenient and cost-effective.

Although the history of the battery electric vehicle (BEV) is as long as that of the conventional automobile, the relatively low energy capacity of its battery has held it back, while the hydrogen car has been lavishly funded, despite its intrinsic shortcomings in efficiency and cost. Batteries are improving and now make the BEV practical but expensive. The solution that renders it thoroughly practical and cost-effective is quick-change modularity, in which the chassis and motive components form a quickly exchangeable module, the Modek, on which rides the body, the Ridon. This modularity allows separate ownership of the Modek and Ridon, and hence an entirely new business model for the automobile. Paradoxically, this takes us back 100 years to what was so obviously a modular vehicle that it was never considered conceptually so to be: the horse and cart! The motive element (the horse) is quickly exchanged and has quite different requirements and economics from the containing element (the cart or wagon). So far was this from being thought of as a modular vehicle that, for all the many terms for the containing element (shay, brougham, coach, trap, jitney, etc.) and the several names for the motive element (hack, pony, nag, etc), there was no single word that covered the combined vehicle. There is such a word for the Ridon/Modek combination; it is Ridek. This is more than mere semantics because when the automobile first appeared, it was called the "horseless carriage." Although it came to be constructed from chassis and body modules, built separately, it remained conceptually an integrated unit. The subsequent development of frameless construction of the auto, where the chassis/body distinction disappeared, so channeled auto design that the quick-change modular car was not proposed until 1997. The author was awarded a patent for it in 2000. Even then its merits were not fully appreciated. Now, after the development of three prototypes over the succeeding seven years, it becomes clear that modularization produces "a much better car."

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