**Section 4 - Environmental Impacts**

**4.1 Disadvantages**

**Oil**

Amongst one of the most common attributes of many sports cars during this era of sprawling JDM manufacturing was oil great oil consumption. This is evident even amongst engines such as the VQ engine by Nissan or Infinite - similarly the rotary burns a lot of oil. The main reason for this is due to there being two areas of injection of oil spray; one in the intake manifold and another in the combustion chamber. Furthermore, on the stand point of the general public these engines deserved more maintenance and a close eye. The rotor would also have to be properly lubrication which, therefore, means that more environmentally unfriendly chemicals are burned and exit through the exhaust or tailpipe.

**Emissions**

The emissions production, caused by the combination of inefficient combustion and oil burning, were great challenges that resulted in the future of rotary engines, during a progressively competitive manufacturing industry with relation to vehicle engines, steadily declining in popularity with the general public. Furthermore,  the challenge of competing with subsequent engines from competing manufacturers and organisations aiming towards fuel efficiency and lower emissions to satisfy standards were great disadvantages marking the decline in development of rotary engine machines.

*Table 1 - Rotary (RX-8) vs Popular Sporty Vehicle Models/Competitors*

*(The Problem With Rotary Engines: Engineering Explained, 2016)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Car** | **Engine Size** | **Weight** | **Power** | **MPG Combined Rating** |
| 2004 Mazda RX-8 | 1.3L Wankel | 3053 lb (1385 kg) | 197-238 HP (Auto/Man) | 18 mpg (13L/100km) |
| 2004 VW GTI | 1.8L I4 | 2934 (1330 kg) | 180 HP | 24 mpg (9.8L/100km) |
| 2004 Corvette | 5.7L V8 | 3214 lb (1458 kg) | 350 HP | 20 mpg (11.8L/100km) |

As highlighted in *Table 1* displays, cars with even more significantly larger engines produces more power with higher fuel economy. With stricter emissions taxes, fees and requirements with being able to register and produce certain vehicles around the world (varying depending on the nation or country) the rotary lived a limited life span.

**4.2 Overall Impacts**

The rotary engine was a great engineering breakthrough altering the designs of engines. In the world of mechanics and engineering this was one of the most successful piston engines of all time and had established a basis for progress on this design that even today is being continuously progressed. Even today engineers are trying to create new and creative uses of these engines and use their design in different areas, such as range extenders.

The public impact that the rotary has caused can be summed up in having its effects towards the world of enthusiasts, transport, racing and engineers. Today the rotary has had the impact of opening research and development into small engine design, hybrid design and fuel efficiency. This sounds strange given that the rotary is anything but fuel efficient, however, the rotary has the potential to be employed within a hybrid system due to its small size.

Furthermore, engineers and designers are continuing to work with the rotary engine in even more hobbyist or research projects of modelling. This can be seen in the following videos:

[Video Source](https://www.youtube.com/watch?v=Ny4-Jc_qW60)

Below is a small example denoting the outreach and how much of an icon the rotary engine has become. Even within toys and the world of model car designing/building, the rotary is a piece of engineering that is viewed by many as a grail. The following video denotes a fully modelled rotary engine with a non-official LEGO built RX-7:

[Video Source](https://www.youtube.com/watch?v=2eTKntiwVgY)

**References:**

[1] - Guthrie, S., 2021. *2021 Mazda MX-30: Electric model with rotary range-extender likely for Australia | CarAdvice*. [online] CarAdvice.com. Available at: <https://www.caradvice.com.au/936107/2021-mazda-mx-30-electric-model-with-rotary-range-extender-likely-for-australia/> [Accessed 11 May 2021].

[2] - Hyatt, K., 2018. *Engineering Explained dives deep on the Mazda rotary engine*. [online] Roadshow. Available at: <https://www.cnet.com/roadshow/news/mazda-rotary-engineering-explained/> [Accessed 11 May 2021].

[3] - Car Throttle. 2016. *The Problem With Rotary Engines: Engineering Explained*. [online] Available at: <https://www.carthrottle.com/post/engineering-explained-why-the-rotary-engine-had-to-die/> [Accessed 11 May 2021].