

Oliver Turner Future 1805585

by Oliver Turner

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Hybrid Technologies

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BEng Motorsport Engineering foundation year

Introduction and Types

(Car?, 2019)

A hybrid car is one that uses more than one means of propulsion - that means combining a petrol or diesel engine with an electric motor.

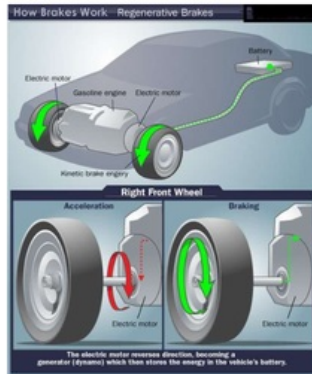
Hybrid technology is an upcoming field in the automotive and motorsport industries.

The three types commonly used are as follows :

Parallel – Parallel hybrids can use a combination of either engine, motor or both combined to produce a balance of power and economy as needed. They work like normal cars, but the batteries can store power when its not needed and release it as it is.

Range Extender – The range extender type uses an electronic motor for power and an engine, usually diesel in order to charge the batteries and as in the name, extend the range.

Plug in – The plug-in type is capable of being plugged into the mains and recharged. These can be either parallel or range extending types but not all hybrids currently have the capability.



Brake regeneration.

Courtesy of

<https://carfromjapan.com/article/car-maintenance/how-does-regenerative-braking-work/>



The first Hybrid race winner

Courtesy of

<https://newatlas.com/go/7646/#gallery>

Hybrids in racing

(Newatlas.com, 2019)

In 2007, Toyota set a record with a Denso Supra hybrid. The first time a hybrid won a serious race, e.g. The Tokachi 24h endurance race.

This is a note of things to come, high level endurance racing is now dominated by hybrid cars due to their energy recovery systems and vast power combined with economy unrivalled by its non hybrid competitors.

Hybrid endurance racing in context

(Motor1.com, 2019)

Debatibly the most serious endurance event in the world currently is the 24h of Le Mans.

Won by a hybrid for the first time in 2012

Won by a hybrid every year since.



First Hybrid Le Mans winner, Image courtesy of

<https://www.theverge.com/2012/6/18/3093371/audi-le-mans-2012-e-tron-quattro-r18-hybrid>



McLaren P1, Porsche 918 and Ferrari La Ferrari. Image courtesy of

<https://www.autocar.co.uk/car-news/new-cars/laFerrari-vs-mclaren-p1-vs-porsche-918-spyder>

In the cutting edge

(Matfoundrygroup.com, 2019)

Recent developments have improved energy recovery from hybrid cars.

Porsche claim their 919 race car to be the most sophisticated Porsche car ever.



Porsche 919 hybrid race car.

Courtesy of

https://www.matfoundrygroup.com/News%20and%20Blog/Hybrids_in_Professional_Racing

Not only does the car produce 900bhp from a 2L turbo engine and electric motor set up, what makes the car special are its energy recovery systems.

Brake regeneration –

During braking, a generator takes the energy lost from braking and uses it to recharge the batteries. This technology is not new but produces 60% of the power the car needs. This is very efficient.

Exhaust regeneration –

What is new is the exhaust regeneration. Half of the exhaust is used to power the turbo. The other half is split off in the exhaust system to power another turbine which generates electricity to charge the batteries and produce more power when its needed. This is stored and then released via the touch of a button.

Influence on Road cars

Already many competitive road cars are edging towards hybrid technologies.

It could be said that this change was confirmed by the rivalry between the McLaren P1, Porsche 918 and the Ferrari La Ferrari.

Although all slightly different, these three cars mark the next level of hybrid technology on the road, combining petrol and electric technologies to create cars with incredible performance whilst maintaining drivability.

A lot of supercar manufacturers are now building hybrid vehicles to unlock vast performance whilst still meeting modern emission standards.

References

Car?, W. (2019). What is a hybrid car and should you buy one? [online] What Car?. Available at: <https://www.whatcar.com/news/what-is-a-hybrid-car-and-should-you-buy-one/n1290> [Accessed 6 May 2019].
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Motor1.com. (2019). Every winner of the 24 Hours Of Le Mans, ever. [online] Available at: <https://uk.motor1.com/news/252435/every-winner-24-hours-le-mans/> [Accessed 6 May 2019].
Newatlas.com. (2019). The first hybrid race win. [online] Available at: <https://newatlas.com/go/7646/> [Accessed 6 May 2019].

FINAL GRADE

70/100

GENERAL COMMENTS

Instructor

Less sources this time but still a good number. I would encourage you to think about the quality of your sources.

When you look at this poster as a whole, it does have a better overall appearance than your historic poster.

In the first column you have put sub-headings in bold, I think this would have also been good to repeat in the third column for Brake Regeneration and Exhaust Regeneration. It would help to make the poster feel more consistent.

This poster swings, in some sections you have good technical depth and then over areas feel a bit shallow with no really information given.

The energy recovery systems are reasonable explained but making statements like 'takes the energy lost' does lead to questions like how?

The influence on road cars helps the poster satisfy the analysis section of the assignment brief.

Future Poster Mark = 70%

Overall CWK2 Mark = 68%



Comment 1

How does it 'take the energy'?



Comment 2

was not e.g.



Comment 3

The name and specs of the vehicle would have been good.

LITERATURE

Very Good
60-69%

(including reading, referencing, academic conventions and academic honesty)

OUTRIGHT FAIL 0-29%	Little or no evidence of reading and/or reliance on inappropriate sources. Views and findings mostly unsupported and non-authoritative. Referencing conventions used incoherently or largely absent.
UNSATISFACTORY 30-39%	Poor engagement with essential reading. No evidence of wider reading. Reliance on inappropriate sources, and/or indiscriminate use of sources. Heavily reliant on information gained through class contact. Inconsistent and weak use of referencing.
SATISFACTORY 40-49%	Engagement with a limited range of mostly relevant and credible sources but with some reliance on information gained through class contact. Some omissions and minor errors. Referencing conventions evident though not always applied accurately or consistently.
GOOD 50-59%	Engagement with an appropriate range of literature, including sources retrieved independently. Some over-reliance on texts rather than other sources. Referencing may show minor inaccuracies or inconsistencies.
VERY GOOD 60-69%	Engagement with a wide range of literature, including sources retrieved independently. Selection of relevant and credible sources. Generally sound referencing, with no/very few inaccuracies or inconsistencies.
EXCELLENT 70-84%	Engagement with an extensive range of relevant and credible literature. Consistently accurate application of referencing.
EXCEPTIONAL 85-100%	Exceptional engagement with an extensive range of relevant and credible literature. High-level referencing skills consistently applied.

K & U SUBJECT

Excellent
70-84%

Knowledge and Understanding of Subject. Extent of knowledge and understanding of concepts and underlying principles associated with the discipline.

OUTRIGHT FAIL 0-29%	Major gaps in knowledge and understanding of the basic underlying concepts and principles of the subject matter. Inclusion of irrelevant material. Substantial inaccuracies
UNSATISFACTORY 30-39%	Gaps in knowledge of the basic underlying concepts and principles, with flawed or superficial understanding. Some significant inaccuracies and/or irrelevant material.
SATISFACTORY 40-49%	Limited knowledge and understanding of the basic underlying concepts and principles within the subject area. Some elements may be missing
GOOD 50-59%	Knowledge of the basic underlying concepts and principles is accurate with a good understanding of the field of study but lacks depth and/or breadth.
VERY GOOD 60-69%	Competent knowledge of the basic underlying concepts and principles. Exhibits very good understanding

EXCELLENT 70-84% Excellent knowledge and understanding of the basic underlying concepts and principles of the subject.

EXCEPTIONAL 85-100% Exceptional, detailed knowledge and understanding of the basic underlying concepts and principles

C&I SKILLS

**Excellent
70-84%**

(Evaluate underlying concepts and principles of a subject and interpret qualitative and quantitative data in order to develop lines of argument and make sound judgements.)

OUTRIGHT FAIL 0-29% Wholly or almost wholly descriptive work. Little or no evaluation of the underlying concepts and principles. Failure to develop arguments, leading to illogical or invalid judgements. Minimal or no use of evidence to back up views.

UNSATISFACTORY 30-39% Largely descriptive work, with superficial evaluation of the underlying concepts and principles. Weak interpretation of data, flawed development of arguments and judgements. Information accepted uncritically, uses generalised statements made with scant evidence and unsubstantiated opinions. Ideas sometimes illogical and contradictory

SATISFACTORY 40-49% Limited attempt at evaluation of the underlying concepts and principles, tending towards description. Can interpret qualitative and quantitative data but with some errors. Some evidence to support emerging arguments and judgements but these may be underdeveloped or with a little inconsistency / mis-interpretation.

GOOD 50-59% Good evaluation of the underlying concepts and principles. Can interpret qualitative and quantitative data, with minor errors. An emerging ability to use evidence to support the argument. Mostly valid arguments and logical judgements.

VERY GOOD 60-69% Sound evaluation of the underlying concepts and principles. Can interpret qualitative and quantitative data accurately. Ability to devise arguments using evidence to make mostly appropriate and valid judgements.

EXCELLENT 70-84% Excellent evaluation of the underlying concepts and principles. Can interpret qualitative and quantitative data accurately and with some insight. Excellent ability to devise arguments using evidence and make appropriate and valid judgements

EXCEPTIONAL 85-100% Exceptional evaluation of the underlying concepts and principles based evidence. Outstanding interpretation of qualitative and quantitative data. Exceptional ability to devise arguments using evidence and make wholly appropriate and valid judgements

PROF PRAC

**Very Good
60-69%**

(Communicate the results of their study/work accurately and reliably, and with structured and coherent arguments; the qualities needed for employment requiring the exercise of some personal responsibility within a structured and managed environment.)

OUTRIGHT FAIL 0-29% Work is poorly structured, disorganised, inaccurate and/or confusingly expressed. Very weak use of language and/or very inappropriate style. Failure to work effectively individual or as part of a group. Little or no evidence of the skills for employment requiring the exercise of some personal responsibility.

UNSATISFACTORY 30-39%	Work is poorly presented in a disjointed manner. It is loosely, and at times incoherently, structured, with information and ideas often poorly expressed. Weak use of language and/or inappropriate style. Flawed approach to individual or group work, meeting only partial obligations to others. Limited evidence of the skills for employment requiring the exercise of some personal responsibility.
SATISFACTORY 40-49%	Mostly ordered presentation and structure in which relevant ideas / concepts are reasonably expressed. Work may lack coherence and/or accuracy in places. Can work as part of a group, meeting most obligations to others but perhaps with limited involvement in group activities. Demonstrates the basic skills for employment requiring the exercise of some personal responsibility, with some areas of minor weakness.
GOOD 50-59%	Mostly coherent, organised and accurate work, in a suitable structure and is for the most part clearly expressed. Can work effectively independently and/or as part of a team, with clear contribution to group activities. Demonstrates the skills for employment requiring the exercise of some personal responsibility, with some areas of strength and some of minor weakness.
VERY GOOD 60-69%	Work is accurate, coherent, fluent, well-structured and organised. Can work effectively independently and/or as part of a team, with very good contribution to group activities. Demonstrates very good skills for employment requiring the exercise of some personal responsibility, with just occasional minor weakness.
EXCELLENT 70-84%	Work is coherent, very fluent and is presented professionally. Can work effectively independently and/or as part of a team, with an excellent contribution to group activities. Demonstrates excellent skills for employment requiring the exercise of some personal responsibility with an appetite for further development.
EXCEPTIONAL 85-100%	Work is accurate, exceptionally coherent, very fluent and presented well. Can work effectively independently and/or as part of a team, with an exceptional contribution to group activities. Demonstrates exceptional skills for employment requiring the exercise of some personal responsibility with an appetite for further development.