



APPENDIX GA36b

LEVEL 4 ASSESSMENT SPECIFICATION

Student name:	Dylan Jones	Student ID number:	JON19851733
Programme:	HNC/HND in Electrical and Mechanical Engineering.		
Module	Engineering Applications and Study Skills		
Module code:	GOEN 4000	Contribution to Overall Module Assessment (%):	40%
Lecturer:	Calvin Williams	Internal Verifier:	Rabya Kadhim
Assignment Title:	Academic and Employability Skills for Engineers.	Word count (or equivalent);	2000
Submission deadline:	10/01/2025	Return date of provisional marks & written feedback:	03/02/2025

Submission method:	All written assessments, where practical and possible, must be submitted via Turnitin unless otherwise instructed by the Lecturer. (Please DO NOT put this assessment specification into Turnitin or it will match many similarities with other students' submissions.) Alternative submission method (if applicable): Late submission of the assessment will result in a late penalty mark. Penalties for late submission: Up to one week late, maximum mark of 40%. Over one week late, 0%. Only the Extenuating Circumstances Panel may approve a change to submission dates.
Academic honesty/ referencing:	Academic honesty is required. In the main body of your submission you must give credit to authors on whose research and ideas your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have used, cited or quoted in order to complete this assessment.

Module Learning Outcomes (from module syllabus)

Demonstrate transferable skills in a learning environment. Apply an academic, positive and professional approach to their studies. Identify suitable and relevant sources of information to meet a research topic of your choice

Task 1. - Understanding Learning Styles

After completing the VARK questionnaire my learning preference is: Mild Kinaesthetic. This isn't a surprise to me because I have always learnt best in a practical environment where I can be hands on with my learning. This is due to me learning best from trial and error and problem solving. This is also paired with talking to teachers or professionals on the subject to allow me to get answers to questions. By talking and asking questions it allows me to gain a better understanding of the topic, ultimately giving me the ability to produce better quality work.

VARK Results:

- Visual – 4
- Aural – 10
- Read/Write – 1
- Kinaesthetic – 13

Preferred Learning Styles	Your Comments
Visual	• Visual learners learn best from images, charts and diagrams. • They will retain information by picturing ideas rather than just text or audio. • They will benefit from structured note taking and highlighted notes/colour-coded notes.
Aural	• Aural learners will learn best from spoken examples and group discussions. • They will be strong in verbal memory as they will recall certain convocations, remember lectures and recorded content. • They are active listeners so they will learn best from group discussions, spoken examples or even audiobooks.
Read/Write	• These will learn best from taking detailed notes and reading detailed text. • They understand and retain information better from reading written instructions/information. • They will retain information by consistently reading/writing notes as this will aid their understanding and memory.

Kinaesthetic	• Kinaesthetic learners will learn best from physical experiences, they will grasp what is going on best by performing hands-on activities. • These learners will engage best when doing interactive tasks such as building different concepts or using real life examples when explaining something. • They will benefit from visual cues such as the teacher pacing, or even using hand gestures to catch their attention and keep them concentrated.
Multimodal	• Multimodal learners will use a combination of learning styles depending on the task they are dealing with. • They tend to switch between all learning styles when trying to get a deeper understanding of complex issues. • These learners will be able to adapt to different teaching styles, allowing them to get a good understanding of the topic no matter the style of teaching they are learning from.
<i>What is identified as your preferred Learning Style</i>	Mild Kinesthetic. From taking the VARK test, it is clear that I learn best from aural and kinaesthetic styles while visualising may help in certain scenarios.

Introduction

In this section I am going to review and evaluate academic papers on VARK learning styles to see if they are beneficial or not. I am going to look at what they are, the positives of VARK and the negatives of it. Finally, I will conclude with my overall view of whether I think understanding your learning style is helpful or not.

Review of Academic Papers

Upon evaluating evidence of VARK, its clear to see that there are numerous learning styles which are categorised into visual, aural, reading/writing and kinaesthetic. Also, if a person falls into many categories they are classed as a multimodal learner as they will select the best learning style to use, depending on the situation they are faced with.

When looking at the positives of VARK, the main point, is that it allows us to understand how we learn best. For example, all students will learn differently, therefore it is vital that teachers cover all learning styles when teaching to allow for all students to learn and

retain information. “The VARK model can be used by teachers to help with strategies of how best to plan and promote student learning based on their type of learning style. Teachers can also help students understand their preferred learning style and maximize their learning by focusing on the mode that benefits them the most. Students can use the strategies to help develop study skills that will help them in school and with the rest of their lives.” - L. Reese, D. (2022). This suggests that if you learn in your preferred learning style you are going to be a lot more engaged and probably more successful in your overall course grade.

On the other hand, the effectiveness of VARK in improving learning outcomes is increasing questioned. Research indicates a lack of evidence supporting the idea that lining up teaching methods with VARK learning styles leads to better academic performance. Studies by researchers such as Newton critique VARK, stating that the lack scientific backing and may even imply to students they have fixed learning styles to follow rather than encouraging adaptability and varied approaches to learning. Professor Newton said, “If students do not achieve the academic grades they expect, or do not enjoy their learning; if students are not taught in a way that matches their supposed learning style, then they may attribute these negative experiences to a lack of matching and be further demotivated for future study.” - Thomas, K. (2021).

Conclusion

After reviewing the positives and negatives of VARK, I think there are relevant points to both arguments. Some positive impacts it can have, is that it allows you to identify where you will most likely learn best, allowing you to adjust your revision and studies with the aim to help you retain information better. However, if you focus on only studying in only your preferred learning styles then this could cause major issues later in life. If you only focus on skills in your preferred learning style, when it comes to being in an environment where you can't learn in your style, you are going to really struggle because you haven't developed adaptability and therefore you will really struggle to apply yourself to the situation and learn.

Reference List

L. Reese, D. (2022). *Considering VARK Modalities to Support Personalized Learning*. [online] blog.definedlearning.com. Available at: <https://blog.definedlearning.com/blog/varkandpersonalizedlearning> [Accessed 10 Nov. 2024].

Thomas, K. (2021). *New review says ineffective ‘learning styles’ theory persists in education around the world*. [online] Swansea University. Available at: <https://www.swansea.ac.uk/press-office/news-events/news/2021/01/new-review-says-ineffective-learning-styles-theory-persists-in-education-around-the-world-.php> [Accessed 10 Nov. 2024].

How can you use what you have learned to aid you in your studies?

<i>Taking information in</i>	• Listen and Talk Through Information: I can use audio recordings and discuss ideas with others to reinforce understanding. • Engage in Hands-On Activities: Do practical exercises and create diagrams or mind maps to visually help me. • Use Movement: Take active breaks, study while moving. For example, listen to educational podcasts while walking. • Teach Others: Reinforce my knowledge by teaching it to someone else.
<i>Studying & Revising</i>	• Teach Others: I can also use this to revise as it will just build on my knowledge and allow me to consciously remember myself saying something when sat in an exam. • Hands on Techniques: Perform tasks such as building a circuit using a bread board to reinforce and test your theory knowledge. • Study Partner: Study with someone who can have discussions about the topic with you, or even quiz you on it.
<i>In exams or class test situation</i>	• Visualise the problem in a practical sense to help me solve. • In an exam or class, it is impossible for me to aurally aid my test.

Task 2 - Developing My LinkedIn Profile

The screenshot displays a LinkedIn profile for Dylan Jones. The profile includes a profile picture, a cover image, and a header with the name 'Dylan Jones' and a 'Add verification badge' button. The location is 'Penllergaer, Wales, United Kingdom' and the current employer is 'Tesco'. The profile shows '2 connections' and buttons for 'Open to', 'Add profile section', 'Enhance profile', and 'Resources'.

Analytics: Private to you. 2 profile views (Discover who's viewed your profile). 0 post impressions (Start a post to increase engagement. Past 7 days). A 'Show all analytics' link is provided.

About: A detailed bio stating the user is an aspiring engineer studying Electrical & Electronic Engineering at Tesco. It mentions a Level 3 Access to Engineering course, a triple distinction (DDD) in Public Services, and a goal to become a valued engineer within the company. A 'Create a post' button is visible.

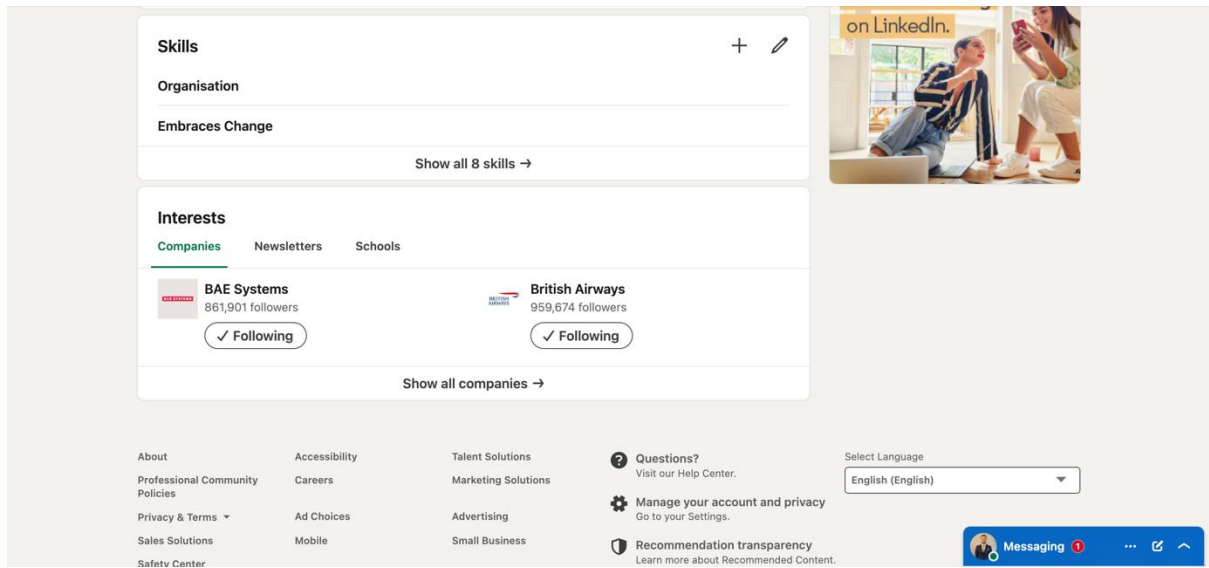
Activity: 2 followers. A message states 'You haven't posted yet'. A 'Show all activity' link is provided.

Experience: A section titled 'Experience' with a '+' icon. It lists a role as 'Sales Assistant' at 'Tesco' from October 2020 to the present, part-time, in Llansamlet, Wales, United Kingdom.

Education: A section titled 'Education' with a '+' icon. It lists two institutions: 'University of Wales Trinity Saint David' (Bachelor's degree in Electrical and Electronics Engineering, Sep 2024 - May 2027) and 'Gower College Swansea' (Access to HE Engineering & Science, Sep 2023 - May 2024, Grade: DDD (Triple Distinction)). A 'Show all 3 educations' link is provided.

Right Sidebar: Includes 'Profile language' (English), 'Public profile & URL' (www.linkedin.com/in/dylan-jones-01759a1b5), 'See who's hiring on LinkedIn', 'More profiles for you' (listing Chloe Chadwick, Lewis Ritch, Ameileo Pulverenti, Ruairi Logue, and Nour Srihini), and 'You might like' (listing Amazon and Lidl GB). A 'See who's hiring' banner is at the bottom.

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Task 3 – Personal development Plan

Goal Number	Short and medium term	Action required	Constraints	Resources – who or what can help me?	Target dates for action
1	Have a career as an engineer.	- Successfully complete my degree in Electrical & Electronic Engineering to a high standard. - Gain practical experience by joining programs or even getting a part time role in a relevant industry. - Expand my network and skills by attending workshops or pop up events	- Academic challenges. I must be able to deal with complex coursework and exams to achieve graduation. - Limited opportunities for internships, co-op programs, or hands-on projects to build necessary skills.	- My uncle will be able to give valuable advice as he is an electrical engineer. - My tutor and lecturers will be able to provide advice and if the university has links with specific companies in industry.	By - 2028
2	Have children.	- Achieve personal, emotional, and financial stability to support a family. - Communicate with my partner about family goals and shared responsibilities. - Build a strong support system of family and friends to ensure a good environment	- If my household salary isn't good enough to afford the expense of having children. - Not having a committed, supportive partner or unresolved differences in family planning goals. - Demanding career or personal commitments that may delay	- My partner because it will be just as much on her as it is on me. - Talk with professionals if any issues are encountered.	By - 2032

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		for raising children.	readiness for parenthood.		
3	Own my own house.	- Set financial goals such as determining my budget, saving for a down payment, and building my credit score. - Create a savings plan and put aside a set amount of my monthly income into a savings pot. - Create and Help to Buy ISA to get money of the government to help towards my first house. - Speak with professionals such as mortgage advisors and estate agents to help buy the correct property for me.	- I may have difficulty saving for a down payment, managing debt, or securing a mortgage with favourable terms. - Lack of knowledge on the property market, mortgage process, or first time buyer schemes. - Unexpected expenses such as taxes, maintenance, or house insurance that could put a strain on my budget.	- Talk to my parents as they would have been through the process of buying a house previously - Talk with estate agents to make sure you are viewing house that you are interested in. - Talk with mortgage advisors so that I know how much I have to spend.	By - 2029
4	Own an Audi RS3.	- Research the cost of an Audi RS3, including taxes, insurance, and maintenance, to allow myself to start saving or investing toward this goal. - Build a strong credit score and reduce debt to qualify for	- Unexpected spending such as emergencies may take a toll on my savings. - The fact I want to own a house first may take a hit on when I can afford to buy an RS3. - If there is a rise in the car market when I want to buy, it would be silly	- Professionals in the field to help me locate the car with the correct specification. - I can help myself by engaging in activities that bring in additional income such as overtime or investments.	By - 2030

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		favourable loan terms. • Maintain discipline by prioritising my goal and avoiding unnecessary spending.	for me to purchase before waiting for prices to drop again.		
5	Have enough money to holiday abroad for 2 weeks at least once a year.	• Create a travel budget by estimating yearly holiday costs and set a realistic savings target. • Save consistently by allocating a set amount of my monthly income aside, specifically for holidays. • Stop unnecessary spending and identify areas of spending I can cut back on. • Work overtime to boost monthly wages.	• Upon having children in my life, it may be hard to holiday every year due to spend more money to support them plus their age. • Allocating funds for a house, family expenses, and career-related investments might leave limited room in the budget for holidays. • Managing multiple life situations at once will take a lot of time up and may leave little room to plan and enjoy vacations.	• My manager at work will be able to help by allowing me time off work. • I will be able to help myself by earning enough money to allow myself to afford to go on holiday. • Online websites such as Skyscanner will be able to help me find the best deals for flights and hotels.	Now - 2024
6	Physically Healthy - Weigh 85kg while having a lean but muscular build.	• I need to consume a high-protein, nutrient-dense diet tailored that aligns with my fitness goals. Making sure my calorie intake supports muscle gain and fat loss. • I need to engage in	• Trying to balance a demanding schedule may result in not having enough time to train or being able to eat the correct foods at the correct times. • My genetic factors will have a big	• I can pay for a personal trainer/nutritionist to help me with my workout. This will make sure I am targeting all muscles group correctly and eating the right foods for maximum growth while staying lean.	By - 2029

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		consistent and regular weight and cardio training. I need to make sure I get adequate sleep (8 hours) to ensure good muscle recovery and to manage stress.	impact on whether I can reach my goal by 2029.	- I can help myself by staying disciplined and always training to failure. - I can also listen to fitness podcasts for training information and motivation.	
7	Mentally Healthy.	- Prioritise activities that I enjoy which will promote good well-being. Adequate sleep and balanced diet also play a key role. - Develop coping strategies like meditation, journaling, or time management to handle life's pressures. - Make sure to build strong relationships with family and friends so that when I am struggling, I have people to turn too.	- Struggling with education can take a toll on my mental health as I know I know failure isn't an option for me to get where I want to be. - If a family members health drastically deteriorates this is going to severely affect me.	- Therapists and counsellors can provide guidance and support for managing stress, emotions, and challenges I am currently dealing with. - Being open with family and friends when discussing challenges, I may be going through. Just speaking to someone can lift a weight of your shoulders.	By – 2024
8	Get a degree in Electrical & Electronic Engineering.	- Attend and excel in all my coursework making sure I understand all the information given to me. - Making sure I participate in all practical	- A lack of knowledge on certain topics will slow my progress down. - A lack of work ethic and discipline with my studies. - Not want to learn to better	- Lecturers will be able to help me when I ask questions about topics I don't fully understand. - I will be able to help myself by putting time aside for self-study to allow myself to	By - 2027

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		sessions to improve my hands on skills, and I will be able to bring this into a workplace upon completion. • Manage my time effectively by planning, stay disciplined with study habits and request help when I need it.	my knowledge on engineering.	grow in and outside of university. • YouTube videos and online course could help me understand topics or answer questions I have when I'm not able to ask questions to my lecturers.	
9	Broaden my Knowledge.	• Read a wide variety of books, even outside the field of my study. • Listen to educational podcasts such as Joe Rogan and Huberman Lab. • Be curious when having convocations. Ask questions to further my knowledge.	• Workload and family commitments may mean that I don't have enough spare time to learn something new. • Overcommitting to learning without rest could lead to me being mentally fatigued, which will reduce retention of information. • Staying motivated and consistently dedicating time to learning, especially when progress feels slow.	• I can speak to current engineers to get a better understanding of the types of jobs in the industry I want to work in. • Friends, family or even people I've never met before can help me as they will know things that I don't. • Online resources can help as I will be able to search for new information.	Now - 2024
10	Financially Stable.	• Track my income and expense to allow myself to prioritise essential spending and	• Taking out a lot of money on high interest loans or credit cards could have an effect on me for years.	• Trusted family members or mentors with financial experience can provide guidance and advice.	Now - 2024

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		set money aside for savings and investments. • Build an emergency fund that in can live off for 6-12 months just in case I fall on hard times or something unexpected happens. • Avoid unnecessary borrowing and pay off debts to avoid high interest rates.	• Having bad habits such as gambling because it will suck you in and will be very hard to stop. • Living beyond my means by going out every weekend partying or going out with my partner to very expensive restaurants which I can't afford.	• Books, online courses, and seminars on personal finance can improve your financial literacy. • Building and maintaining a savings cushion for unexpected expenses can protect you from financial setbacks.	
11	Not to have bad debt.	• Live to my means, only spending what I can afford to. • Pay off loans and credit cards promptly to avoid building up high interest rates. • Take on debt only for productive purposes, like education or property, and ensure repayment terms are manageable.	• If I started using Klarna's pay later scheme to buy all my online shopping, I may end up losing track of everything I've spent, result in spending more than I can afford to pay off. If this happens high interest rates will be put on the money I owe. • If I don't have an emergency fund, I might resort to borrowing for urgent financial needs, leading to bad debt.	• Banks or credit unions may offer low-interest loan options or even financial advice. • Friends and/or family who are financially disciplined can help me stay on track and avoid poor financial decisions. • I can build a savings account to act as a buffer for unexpected expenses.	Now - 2024

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12	Don't be frustrated by life choices.	• Set career goals that I want to achieve and make sure they align with my long term vision. • Weigh up the pros and cons to my decisions and make sure they'll have a positive impact on my happiness. • Make sure to reflect on how far I've come and what I've achieved rather than always worrying what's next.	• If I am not clear with my goal setting, it could lead me to making decisions that don't align with my long term goals. • If I overthink decisions by looking too far into the future, I could mean I miss out on opportunities, leading to frustration. • If I constantly compare myself to other people's situation, this could lead to dissatisfaction with my life.	• I can use goal setting techniques such as SMART to help me stay on track with where I want to be. • I need to always embrace change and look at setbacks as an opportunity to learn and grow. • Surround myself with positive influences such as friends, family, or community groups.	By - 2030
13	Be married	• I need to focus on my own personal growth, maturity and stability. • Build meaningful connections with people and pursue relationships that align with my values and goals. • Establish open and honest communication with my partner.	• A lack of personal growth, self-awareness, or readiness to commit to a lifelong partnership. • External influences such as family expectations or social pressures that could cause the relationship to break down. • If I hold rigid views about relationships, this will make finding a suitable partner more challenging.	• Build relationships based on being open, having shared values, and mutual respect to create a strong foundation for marriage. • Seek advice from relationship coaches to build the skills needed for lasting connections. • To always be myself and not put on an act for someone because there's only so long the act can last.	By - 2034

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14	Healthy Relationships	• Communicate openly by expressing my honest thoughts and feelings. • Show support to others when they need it by offering help or encouragement. • Put time and effort into relationships that I value.	• Balancing my work, personal goals, and other commitments may leave me limited time to invest in building or maintaining relationships. • If I'm carrying baggage from past relationships, it might affect trust and openness in current relationships.	• Trusted friends/family can provide feedback, support, and encouragement to help you grow in your relationships. • Connect with people in groups which focus on personal development or where I have shared interests to foster meaningful connections.	Now - 2024
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Do Anti-Lock Braking Systems Benefit or Disadvantage Cars?

By Dylan Jones

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Abstract

This study investigates how Anti-Lock Braking Systems (ABS) improve vehicle performance and safety, by looking at its impact on Formula 1 cars and street cars. It looks at how ABS works technically, how it affects collision and mortality rates, and why it isn't allowed in Formula 1. The research discusses the contentious impact of ABS on single-vehicle crashes and fatal accidents while highlighting the benefits of ABS in preserving stability and lowering accidents in road cars through an analysis of safety data and braking performance indicators. On the other hand, Formula 1's preference for driver ability over automated systems highlights the need for achieving a balance between human expertise and technical innovation. The purpose of this study is to present a thorough assessment of ABS's performance in a range of settings and applications.

Introduction

In this research assignment, I am going to be looking into the Anti-Lock Braking System (ABS). I am going to be looking at what it is, how it helps drivers and how it compares between roads cars and Formula 1 cars. After exploring the difference in impact it has between road cars and Formula 1 cars, I will give an overall conclusion on the impact the system has, based off all the information gathered.

Aims & Objectives

- Look at the safety impact it has on road cars.
 - Look at how it helps under heavy braking.
 - Look at how it decreases stopping distance in various conditions.
 - Look at crash statistics before and after its implementation.
- Explore if it has had an impact on race cars.
 - Is ABS used on race cars such as Formula 1.
 - If it is not used, why isn't it?
- Conclude with overall summary and state if ABS has a positive or negative impact.

Debate

Anti-Lock Braking System

Anti-lock Braking Systems (ABS) are a key safety component in modern road vehicles which prevents wheel lock-up during braking. ABS increases road safety, it does this by, improving vehicle stability, maintaining steering control, and decreasing stopping distances across many different road surfaces and in various weather conditions. The system uses sensors, a control unit, and hydraulic modulators to track and alter brake pressure when needed. This feature vastly helps drivers in emergency braking circumstances, particularly in bad weather. ABS is widely used in passenger and commercial vehicles, and it plays an important role in accident prevention and overall driving safety (Dadhich. A, 2020).

Safety of ABS on Road Cars

In this section of my report, I am going to review the safety impact the ABS system has on road cars. I will look at how it decreases stopping distances in various weather conditions. Lastly, I am going to gather data that compares the crash rate before and after ABS was introduced.

The Anti-lock Braking System (ABS) is a critical safety feature in modern road vehicles, designed to prevent wheel lock-up during harsh braking or under low-traction conditions such as rain, snow, or ice. By ensuring optimal braking performance, ABS significantly enhances vehicle control and stability, particularly in emergency situations. The ABS system was made a mandatory requirement for vehicles in the UK from 2004.

The system consists of sensors on each wheel to monitor individual wheel speeds. When a wheel is detected to be decelerating too rapidly, indicating potential lock-up, the ABS system kicks in and modulates the brake pressure to that wheel. This process involves rapidly applying and releasing the brakes in a precise and controlled manner, allowing the driver to maintain steering capability and control of the vehicle. By preventing skidding and loss of control, ABS reduces the likelihood of accidents, contributing to lower crash rates and improved road safety. (Viramgama, D, 2019).

The ABS system decreases vehicle braking distances because it allows for the wheel to maintain good connection with the road surface by preventing the wheels from locking up. ABS avoids uncontrolled skidding, helping reduce the stopping distance. For example, if you were driving and an accident happened in front of you, resulting in you having to perform an emergency stop, your ABS system would kick in to stop your wheels from locking up. If the ABS did not kick in, the vehicles wheels would lock up, most likely leading to a complete loss of control of the car, potentially leading to a crashing.

ABS significantly increases vehicle safety due to its ability to reduce stopping distances compared to cars without ABS as they would end up having locked-wheel braking, especially on slippery surfaces. ABS enhances directional stability due to it preventing rear-wheel lock-up and spin outs. This ensures that the vehicle remains stable, and in the drivers control during hard braking such as in the event of emergency situations. In addition to this, ABS delivers consistent braking performance, making it a very helpful system for non-skilled drivers. When taken as a whole, these advantages make ABS a vital component for road cars, helping to improve control and lower danger in specific driving situations. (Oppenheimer, 1988).

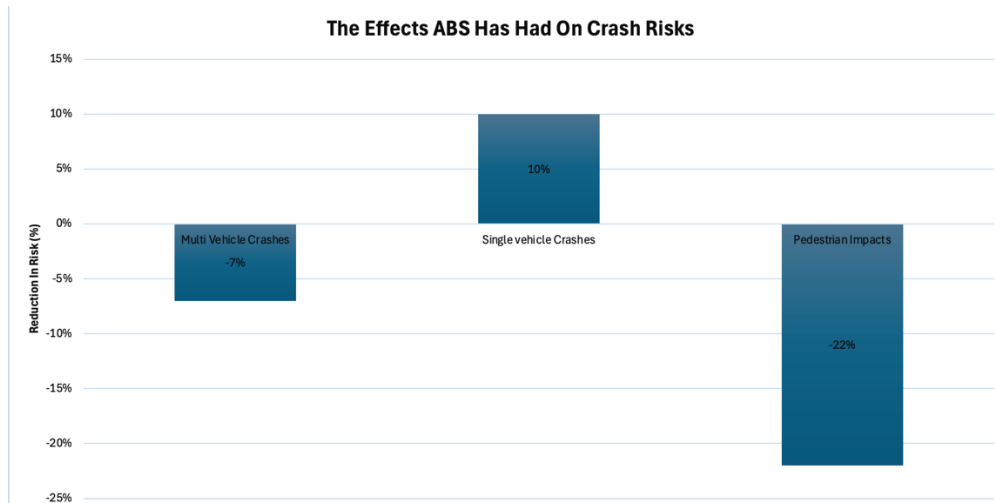
When reviewing reports to look at the crash statistics of cars with and without ABS, it's very interesting to see the impact it has had. A meta-analysis of research studies suggests that Anti-lock Braking Systems (ABS) reduce overall crash rates by a relatively small but statistically significant amount when all degrees of severity and crash types are considered. However, the studies show variations in certain accident conditions. ABS has been linked to statistically significant increases in rollovers, single-vehicle crashes, and collisions with immovable objects, as well as reductions in collisions involving pedestrians, cyclists, animals, and turning vehicles. ABS has no substantial impact on rear-end crashes. Although ABS reduces injury collisions by 5%, it results in a disturbing 6% increase in fatal crashes, highlighting the need for more inquiry into the factors that contribute to this outcome. – (European Commission, 2018).

When reviewing papers looking at crash risk and ABS, it is clear to see that multi-vehicle crashes were reduced with ABS being equipped to vehicles, single vehicle crashes which include rollovers increased slightly due to ABS, and crashes including pedestrians and

cyclists were decreased significantly. It is also reported that cars with ABS systems fitted, were 24% more likely to be involved in fatal car crashes than cars without ABS. ABS was seen to have very good effects on wet and icy surfaces, reducing crashes significantly. Whereas, when it's used on dry surfaces, it does help but the effects are less pronounced. (Farmer, C.M., 2001).

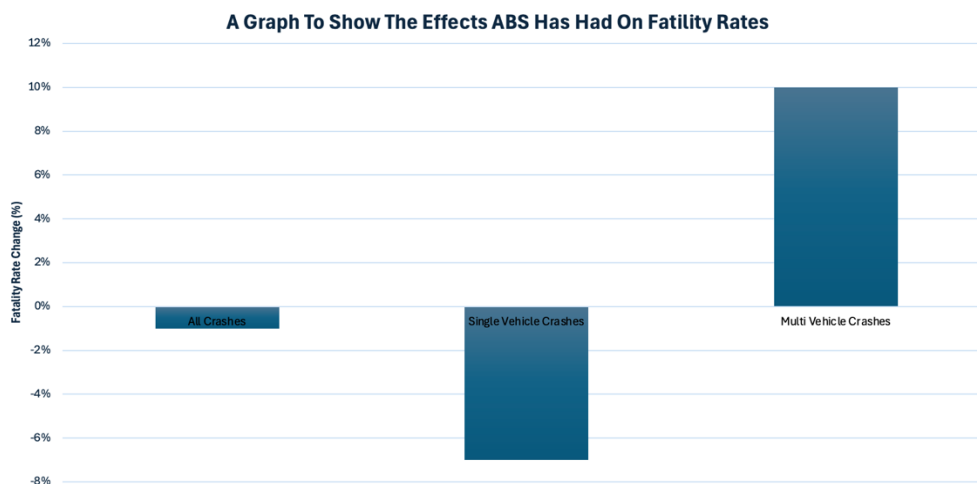
Graphical Data to Represent ABS Effects on Crash Risk and Fatality Rates

Changes in crash risk by crash type and severity.



- Multi-vehicle Crashes: Reduced by 7%.
- Single-vehicle Crashes: Increased by 10%.
- Pedestrian Impacts: Reduced by 22%.

Fatal vs. non-fatal crashes with ABS compared to non-ABS vehicles.

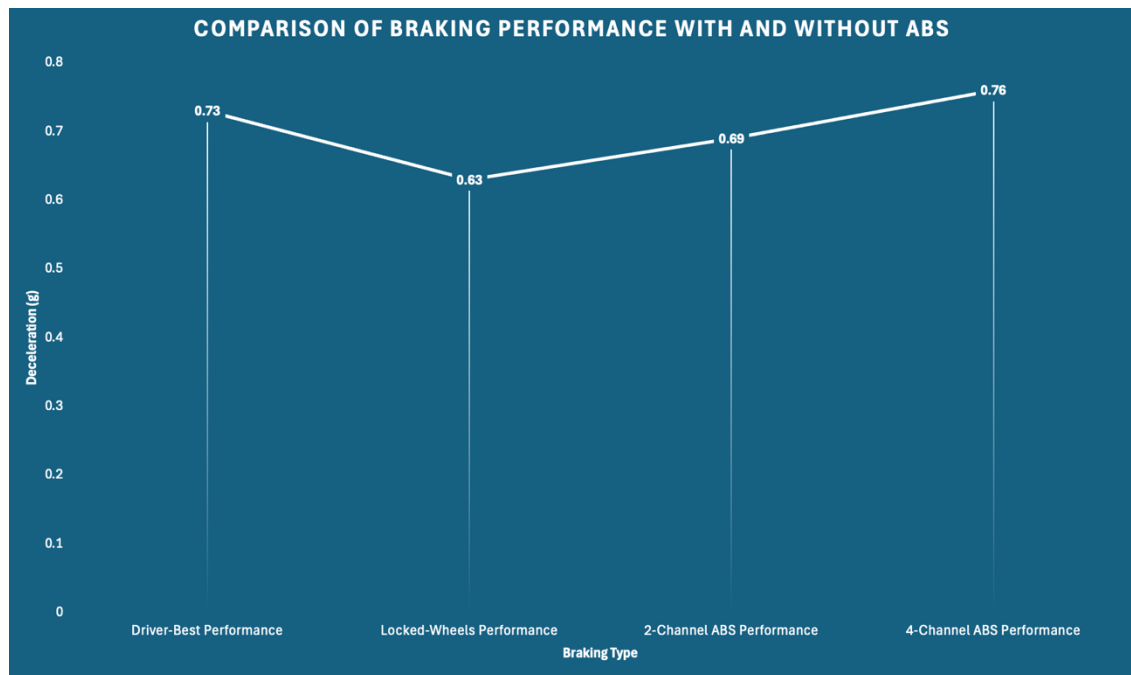


- All Crashes: Fatality rates decreased by 1%.
- Multi-vehicle Crashes: Fatality rates decreased significantly by 7%.
- Single-vehicle Crashes: Fatality rates increased by 10%.

(David Burton, Amanda Delaney, Stuart Newstead, David Logan, Brian Fildes, 2004)

This shows us that even though the ABS system helps drivers daily with the avoidance of minor/less serious crashes, it has in fact increased the chances of having a fatal crash. The ABS system contributes to more single vehicle/rollover crashes which leads to this increase. After reviewing many reports and seeing the data above, it's clear to see that there isn't a conclusive decision on whether the ABS system on road cars has had a positive impact.

Braking Performance of Road Cars With Various Braking Systems



- **Driver-Best Performance (0.73g):** This shows the optimal deceleration achieved by a skilled driver without ABS.
- **Locked-Wheels Performance (0.63g):** This shows the deceleration, when the brakes are fully applied without ABS, causing the wheels to lock. This will typically result in longer stopping distances.
- **2-Channel ABS Performance (0.69g):** This shows the deceleration achieved with a two-channel ABS system, which controls braking independently for two wheels (e.g., front and rear).
- **4-Channel ABS Performance (0.76g):** This shows deceleration achieved with a four-channel ABS system, offering the highest braking efficiency by controlling all four wheels individually.

(Oppenheimer, 1988).

ABS In Formula 1 Cars

In this part of the report, I am going to be looking at formula 1 cars, to see if the ABS system is used and how it helps. If it is not used, I will look at why it's not and the affect it has by not being used considering the harsh braking which is the nature of the sport.

Formula 1 is known for its elite level athletes with them being said to be the best 20 racing drivers in the world, due to their extreme skill and precision, physical fitness, reaction time, competitiveness, and experience across diverse conditions. ABS systems in Formula 1 are in fact banned from the sport by the FIA (Fédération Internationale de l'Automobile), who are the governing body for Formula 1 and many other motorsports. The FIA imposes strict rules to limit automation, such as banning ABS and traction control, ensuring the driver's role remains central. This ensures there is a balance between cutting-edge engineering and driver skill, giving F1 its unique identity as a competitive and skill-driven sport (Young, S., 2012).

With Formula 1 drivers being highly skilled, they can modulate the brake pressure manually to avoid locking up their wheels, a task ABS is designed to do. The drivers will aim to apply the maximum pressure without locking up, however drivers do sometimes brake too harshly causing the wheels to lock up. This is when they must use their skill of being able to cadence brake, to stop the wheels locking up and crashing. They will release braking pressure to get the tyres spinning again before reapplying brake pressure to slow them down to make the corner they are trying to go around. The following link will take you to a video that explains braking on Formula 1 cars - <https://www.youtube.com/watch?v=3zy20w0zNHE>.

When looking at why ABS is banned, considering the help it provides to the driver, there are many reasons. The main reason provided for ABS being banned is that it ensures the drivers skill remains the dominant factor in making the difference between the drivers when under braking. This means there is a consistent challenge for drivers, emphasising driver talent over allowing electronic aids to create a level playing field. ABS was banned in Formula 1 by the FIA in 1994, as well as other driver aids, to avoid over-reliance on technology and to emphasise the role of the driver when racing.

The ban of ABS in Formula 1 makes drivers depend solely on their braking abilities, such as threshold braking and cadence braking, to avoid wheel lock-up. This greatly increases the

difficulty, especially in conditions with poor traction, such as bad weather or low-grip circuits. Drivers must be extremely careful when balancing brake inputs to maintain control of the car, which tests their ability to deal with high pressure and adds to the sport's competitiveness. By enforcing a ban on automated braking assistance, the FIA assures that human expertise stays at the forefront of racing technology.

The lack of ABS is consistent with Formula 1's stance of highlighting drivers input over automation. This decision also optimises the mechanical design of the vehicles, allowing engineers to focus on their getting the most out of their expertise while staying within defined limitations. Furthermore, the ban on ABS and other driver aids means that victories are determined by driver skill, teamwork, and strategy rather than the sophistication of onboard technologies. The regulations demonstrate Formula 1's dedication to combining cutting-edge technology with the traditional challenges of motorsport (Balla, E., 2023).

Conclusion

In conclusion, road vehicles benefit greatly from Anti-Lock Braking Systems (ABS), especially when it comes to keeping stability and control during emergency braking and on low-traction surfaces. It effectively reduces multi-vehicle and pedestrian-related crashes, making it invaluable for everyday driving safety. ABS systems do however have certain disadvantages, the unforeseen rise in fatal incidents and the connection with higher rates of rollover and single-vehicle collisions point to the need for more research and development. In relation to Formula 1, the lack of ABS supports the focus on driver talent and accuracy, which is consistent with the sport's values of preserving human expertise at the forefront. Although ABS is an essential tool for road cars, its removal from racing shows a careful balance between maintaining competitive integrity and developing technology. Through the whole study, ABS has proven its impact in various driving situations, therefore ABS has ultimately proven to be a pillar of automobile safety.

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Do Anti-Lock Braking Systems Advantage or Disadvantage Cars?

By Dylan Jones

Introduction

- What is ABS? - Vital safety feature, helps the driver maintain control. Made up of sensors, a control unit and brake pressure modulator.

Objectives

- Access the safety impact of ABS on road cars.
- Look at the absence of ABS in Formula 1 cars.
- Conclude on the overall impact of ABS.

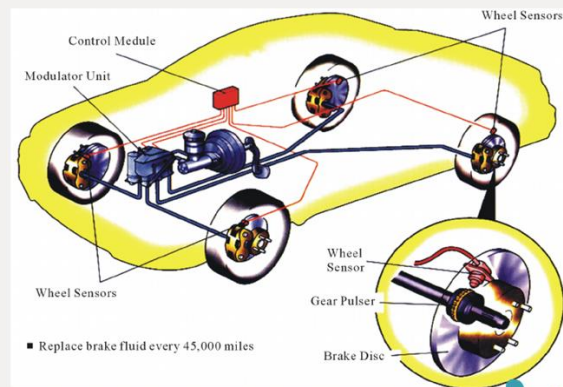
How ABS Works

Components

- Sensors monitor wheel speed.
- Control unit processes data.
- Hydraulic modulators adjust brake pressure.

Functionality

- Prevents skidding
- Allows the driver to maintain control.



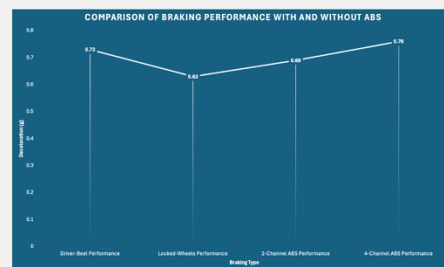
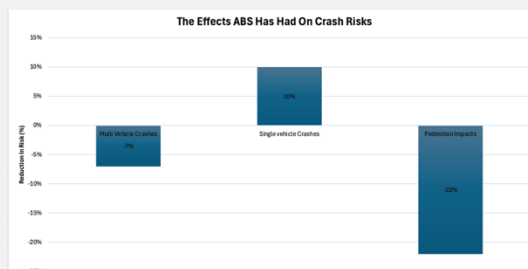
Safety Impact on Road Cars

Benefits

- Reduces stopping distance in a range of weather conditions.
- Improves stability and control in emergency braking situations.

Crash Data

- Reduction in multi-vehicle crashes by 7%.
- Significant decrease in crashes involving pedestrians (22%).



Drawbacks of ABS on Road Cars

- There has been a 10% increase in single-vehicle crashes.
- Cars with ABS systems fitted, were 24% more likely to be involved in fatal car crashes.

Factors

- Misuse or over-reliance on ABS.
- Road conditions and driver behaviour.

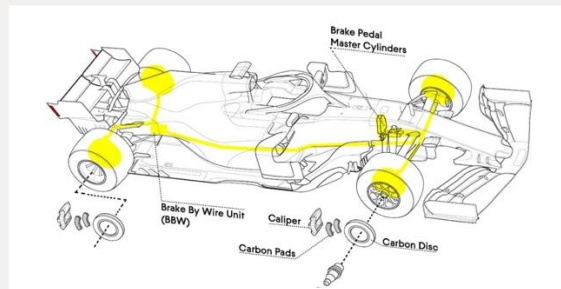
ABS In Formula 1

Why ABS is Banned

- Emphasis on the driver's skill.
- FIA regulations limit automation in the sport.

Driver Techniques

- Threshold Braking - Inputting the maximum brake pressure without locking up.
- Cadence Braking - If they do lock up the wheels, they will release brake pressure and then reapply the brake pressure.



Conclusion

Key Points

- Overall, ABS improves safety in road cars, but it doesn't come without its drawbacks.
- In Formula 1, ABS is banned because the sports main focus is driver skill.

Final Statement

- ABS is an extremely vital safety feature in road cars
- Unnecessary in Formula 1.