

Module Code: SHSS4075

What do you consider to be the best aspects of this work?

Which aspects do you consider could have been improved in this piece of work?

What have you found most satisfying whilst undertaking this submission?

<u>ASSESSMENT</u> <u>CRITERIA</u>				Learning
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<u>Poor</u> <u>≤</u> <u>20%</u>	<u>Weak</u> <u>20-</u> <u>29%</u>	<u>Unsat</u> <u>isfact</u> <u>ory</u> <u>30-</u> <u>39%</u>	<u>Satisf</u> <u>actor</u> <u>y</u> <u>40 -</u> <u>49%</u>	<u>Good</u> <u>50 -</u> <u>59%</u>	<u>Very</u> <u>Good</u> <u>60 -</u> <u>69%</u>	<u>Excel</u> <u>lent</u> <u>70 -</u> <u>84%</u>	<u>Exce</u> <u>ption</u> <u>al</u> <u>85-</u> <u>100%</u>	<u>%</u>
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Accuracy and relevance of content.40%

1

General plan and structure of answer.40%

1

40
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<u>Range of sources of information and referencing accuracy.20%</u>	<u>1</u>									<u>20%</u>
<u>It is expected that students will present work that is proof read and follows the School Reference Guide and Assessment Checklist. Therefore a range of 0 – 10 marks will be deducted for non-completion of any of the points on the checklist below.</u>										
<u>TUTOR COMMENTS:</u>										
<u>Submission date:</u> <u>10th January 2020</u> <u>via Turnitin</u>	<u>Return date:</u> <u>(at least within 4 weeks)</u>		<u>Tutor: Karin Thomas</u>				<u>Mark:</u>			

Water is 1000 times more dense than air, so when the body moves forward through it, the water resists its movement

The physics of water and air differ significantly with scientists calculating that water is 1,000 times more dense than air making it harder for a body to move through water. As water is 1000 times more dense than air it makes it harder to get from one place to another. That is why we don't walk through water and we swim. Swimming is easier than water as it reduces the amount of drag we have to face. There are 3 main types of drag, Profile drag, Viscous drag and Wave drag which touches on Eddy resistance. Profile drag is the result of the space the swimmer takes up and the shape they present to the water. Profile drag is the fully dependant on the swimmer and the swimmer's technique and body shape. Viscous drag is the friction between the swimmer's skin and the water. The amount of drag experienced is determined by the roughness shape and hairiness of the swimmer's body. Wave drag is the turbulence at the surface of the water where the water and air meet. This is affected by the entering and exiting of body parts into and out of the water. Wave drag also related to the way the body part enters or exits the water as if it creates a big wave the more resistance there is. Eddy drag is the movement of the water and the currents the swimmer produces. When a swimmer propels themselves through the water, the water they displace in front of them creates a current and that flows around them to behind them. This then creates a low pressure behind them, and this eddy resistance is dragging them back.

The first drag I am going to talk about is Profile drag. As Rushall (2009) states that profile drag is the shape of the swimmer in the water. Rushall goes on to state that by having a better body position, by trying to create the thinnest and straightest form while going through the water, you could reduce the amount of profile drag you produce. Profile drag is caused by just being in the water and you can never completely eradicate profile drag but you can use techniques to reduce it, such as trying to be as streamlined as possible and keeping leg kicks mainly underwater and trying to keep the frontal area to a minimum. This relates to front crawl in terms of head position. You want to keep the head down in the water allowing a lesser frontal area than a head out of the water. This is because if your head is up in the water it is a lesser streamlined position and it creates more profile drag. This drag can be reduced by working on that streamlined position and getting the swimmer to be getting into that streamlined position as a habit. Profile drag also relates to back crawl as body position again is key by keeping the body as straight as possible and allowing the body to have as little drag as possible.

The second drag I am going to talk about is Viscous drag. Viscous drag is also commonly called skin frictional drag. As Rushall (2009) states it is the roughness of the skin, amount of hair and swimsuit material can all affect how much drag and friction is created. Rushall goes on to suggest that this drag will only give minimal amounts of drag and is usually only a problem when it comes to high performers in swimming especially when it comes to competition time suggesting that only Olympic athletes can really gain any benefit from doing anything about this drag as it won't reduce times by too much. This can be true as when Michael Phelps set the world record for 100m butterfly in Beijing in 2008 he won the

race by only a hundredth of a second (International Olympic Committee, 2012). This relates to back stroke as a similar situation happened in the 200m women's backstroke in the Rio games in 2016, where American Madeline Dirado beat Hungarian Katinka Hosszu by six hundredths of a second to win gold (International Olympic Committee, 2017). In the same Olympic games in Rio 2016 there was only one hundredth of a second between American gold medallist Anthony Ervin and Frenchman Florent Manaudou in the 50m men's freestyle (International Olympic Committee, 2017). Rushall (2009) suggests way to reduce skin frictional drag such as wearing a latex swimming cap as this swimming cap will provide a "smoother surface" than a head of hair and thus reducing the frictional drag that the hair creates. Rushall also suggests that shaving certain parts of the body and thus making them smoother can reduce the viscous drag, He states the places you should shave as "body and legs, but not the forearms" going on to suggest than having a thin layer of hair can actually increase speed as by having a thin layer of water attached to the hair would reduce frictional resistance as the only friction would be between water and water.

The next drag I am going to talk about is Wave drag. Wave drag is the turbulence at the surface of the water where the water meets the air. A wave is created when a body part such as the arms, legs or head either enters or exits the water. Wave drag is always going to be present when swimming any stroke as due to the technique, a body part exits and enters the water as this is what creates the thrust that swimmers need to propel through the water (Honda, 2016). Wave drag can also be contributed by the entry and exit of body parts from the water to form what is known as Eddy resistance. Eddy resistance is when the movement of water creates currents which is caused by the water filling in behind the swimmer as he moves forward. Honda (2016) shows diagrams of how this works while swimming, noting that the more streamlined the body position of the swimmer the less Eddy resistance as Eddy resistance is creating a low pressure behind the swimmer and almost pulling them back. Honda goes on to state that the less streamlined and the poorer the body position the more Eddy drag the larger the amount of low pressure behind the swimmer thus becoming more resistive to the swimmer trying to thrust themselves forward. Wave drag main causes are from poor body position and poor technique. In front crawl the main component of poor body position is sinking hips as the diagram on Honda's 2016 PowerPoint show. The way to correct this would be to get the swimmer to start kicking from the hips with a relaxed knee as his will raise the hip height and reduce the amount of Eddy drag. The next most common is head position especially in beginners who are struggling to breathe. Instead of keeping their head down and moving head to the side to breathe they keep bringing their head out of the water and this is creating constant waves every time they breathe. This can be easily sorted as it would only need to be technique change to get the swimmer to move their head to the side instead of up and down. This also relates to back stroke as hand position is what is creating the majority of the wave drag. This can be reduced by getting the swimmer to learn the correct technique of hand position when entering and exiting the water. Getting the little finger into the water first and getting the thumb to come out of the water first will reduced the size of the wave and thus reducing the amount of drag.

To conclude we as swimmers will never be able to eradicate drag and resistance of the water while swimming, but we can use tricks and techniques such as shaving body hair, wearing swimming caps as well and teaching the correct techniques and getting beginner swimmers into good habits early on. We can still constantly improve how we deal with the different

types of drag and resistance and what we can do educate ourselves and others on these different types of drag and how we can overcome these to the best of our abilities.

Word count: 1355

Reference list:

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