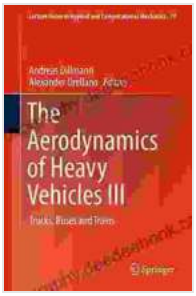
The Aerodynamics of Heavy Vehicles III: Exploring the Impact of Vehicle Height and Shape on Aerodynamic Drag

Aerodynamic drag is a major factor that affects the fuel efficiency of heavy vehicles. By understanding the impact of vehicle height and shape on aerodynamic drag, we can design more efficient vehicles that consume less fuel and produce fewer emissions.



The Aerodynamics of Heavy Vehicles III: Trucks, Buses and Trains (Lecture Notes in Applied and Computational Mechanics Book 79) by D C Robinson

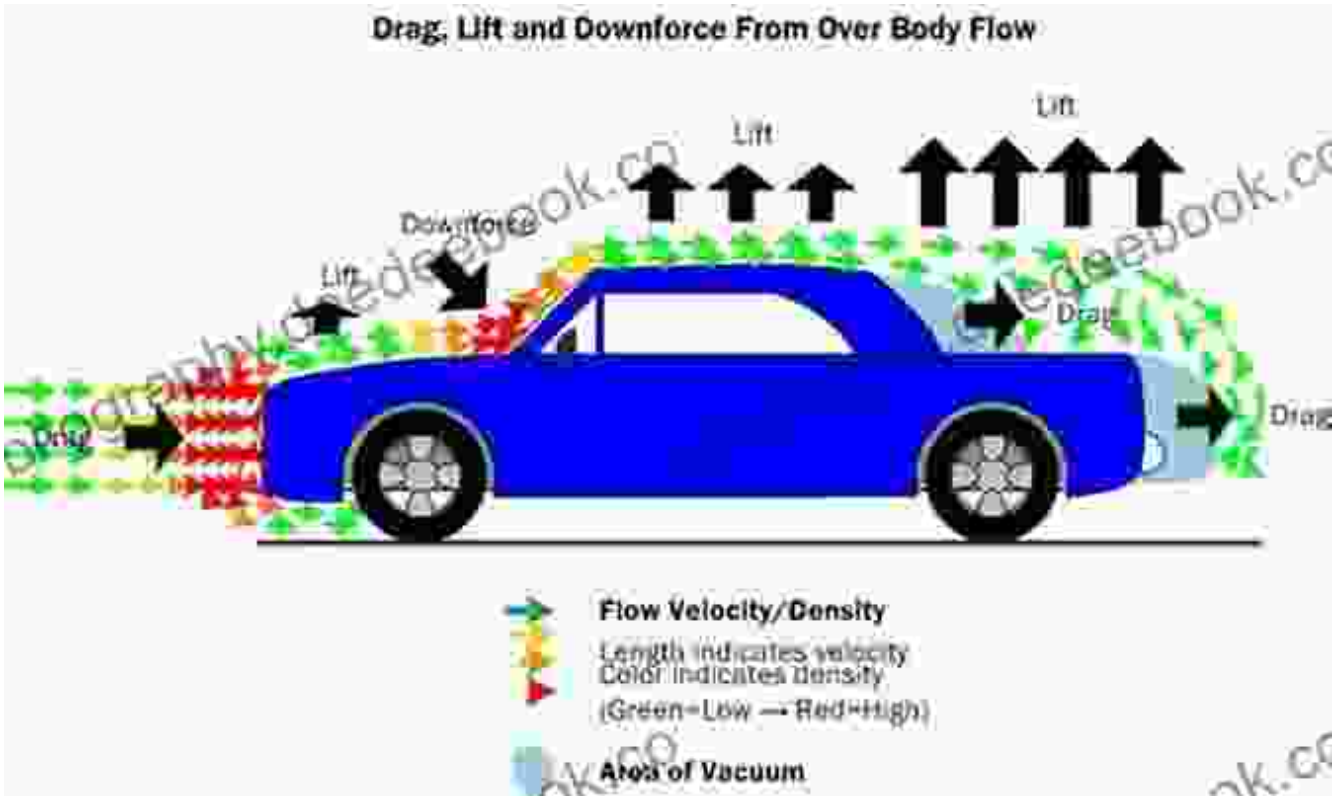
4.8 out of 5

Language	: English
File size	: 28347 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Print length	: 437 pages

The Impact of Vehicle Height on Aerodynamic Drag

The height of a vehicle has a significant impact on its aerodynamic drag. Taller vehicles have a larger frontal area, which means that they encounter more air resistance. This increased air resistance results in higher drag forces, which can reduce fuel efficiency.

The following graph shows the relationship between vehicle height and aerodynamic drag:

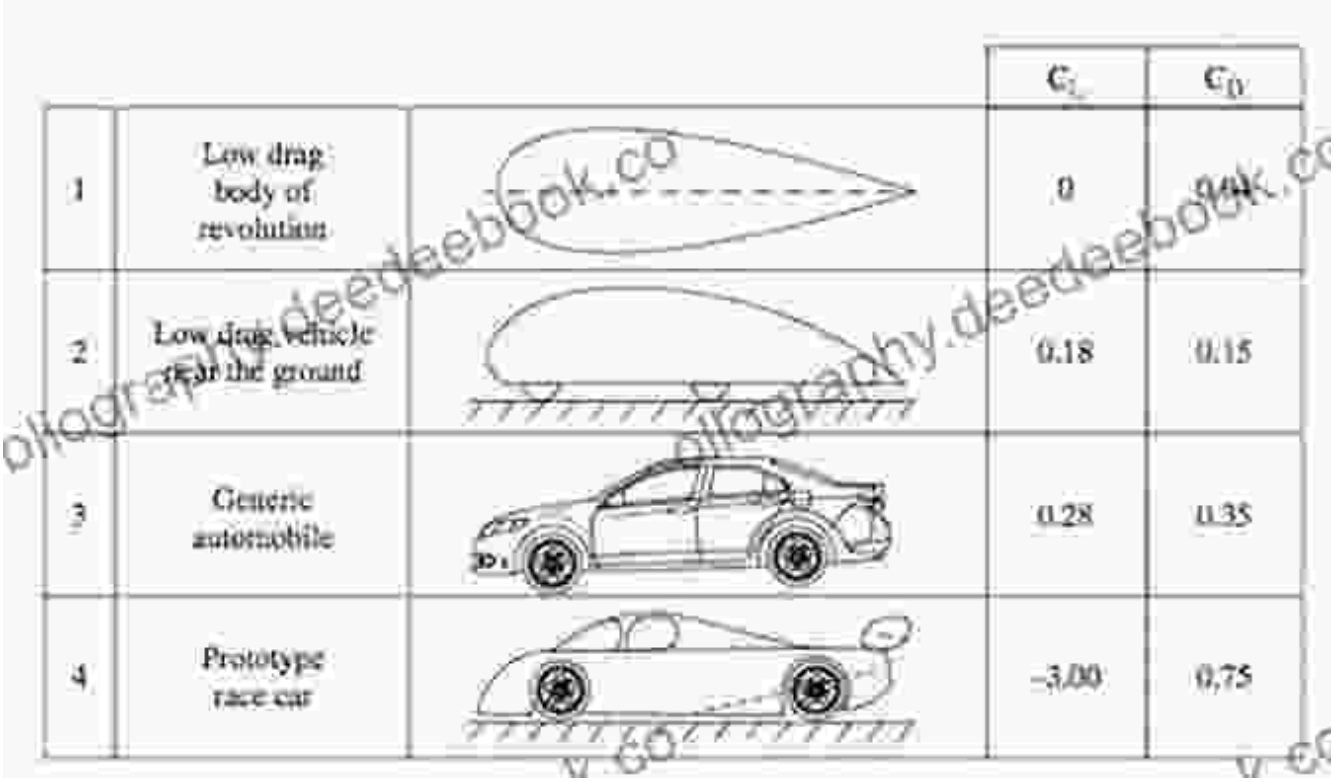


As you can see from the graph, aerodynamic drag increases as vehicle height increases. This is because taller vehicles have a larger frontal area, which means that they encounter more air resistance.

The Impact of Vehicle Shape on Aerodynamic Drag

The shape of a vehicle also has a significant impact on its aerodynamic drag. Vehicles with streamlined shapes have lower drag coefficients than vehicles with blunt shapes. This is because streamlined shapes reduce the amount of air resistance that the vehicle encounters.

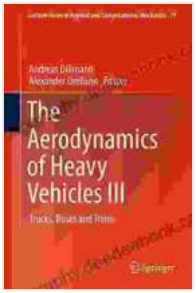
The following graph shows the relationship between vehicle shape and aerodynamic drag:



			C_L	C_D
1	Low drag body of revolution		0	0.05
2	Low drag vehicle near the ground		0.18	0.15
3	Generic automobile		0.28	0.35
4	Prototype race car		−3.00	0.75

As you can see from the graph, vehicles with streamlined shapes have lower drag coefficients than vehicles with blunt shapes. This is because streamlined shapes reduce the amount of air resistance that the vehicle encounters.

The height and shape of a vehicle have a significant impact on its aerodynamic drag. By understanding the impact of these factors, we can design more efficient vehicles that consume less fuel and produce fewer emissions.



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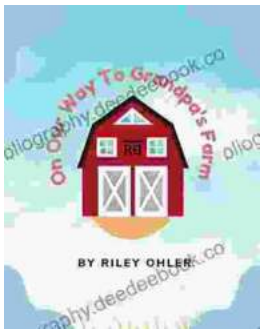

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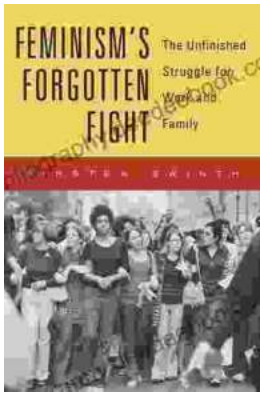

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