# Bluff-Body Turbulence

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**abstract here *LH&FZ***

## Nomenclature

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$\rho$ = density, $kg/m^3$

Subscripts

$()_\infty$ = freestream quantity

Acronyms

CFD = Computational Fluid Dynamics

## I. Introduction

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INTRO sentence to paper should have this fancy capitalization.

- Real World Applications
  - parachute
  - reentry capsule
  - vehicles
  - buildings
  - show similarity between cylinder/sphere wake and more complex bluff body
- Driving Physical Phenomena
  - blunt/bluff body definition, differences from streamlined body flow
  - massively separated flow
  - base pressure
  - wake

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## II. Experimental Methods And Results

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- Historical Study
- Experimental techniques
  - ballistic range?
- Applications
  - Simple cases: cylinder/sphere
  - Sharp vs bluff: sphere vs cube
  - Complex cases: capsule/building

## III. Computational Methods and Results

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- Historical Study
- Computational techniques
- Applications
  - Simple cases: cylinder/sphere
  - Sharp vs bluff: sphere vs cube
  - Complex cases: capsule/building

### A. Turbulence Modeling Aspects

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- Compare turbulence model performance for sphere/cylinder
  - SA
  - SST
  - SAS
  - URANS
  - LES
  - DES
  - DNS?

## IV. Current State of Bluff-Body Turbulence

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- Current State of Knowledge

- Remaining Challenges

## V. Conclusions

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## Acknowledgments

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Example citations

[1]

## References

[1] Nakamura, Y., "Bluff-body aerodynamics and turbulence," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 49, No. 1, 1993, pp. 65 – 78. doi:https://doi.org/10.1016/0167-6105(93)90006-A, URL `http://www.sciencedirect.com/science/article/pii/016761059390006A`.