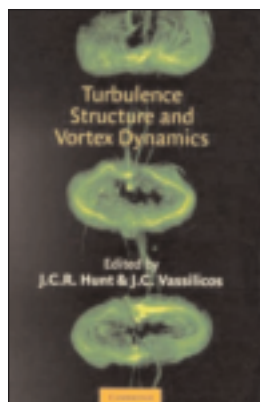


Turbulence Structure and Vortex Dynamics

**J. C. R. Hunt and
J. C. Vassilicos (editors)**
Cambridge University Press
New York, NY
306 pp., \$85
2000



This is another one of many published monographs containing various papers by multiple authors, each attempting to shed some light on the understanding of turbulent flows. In this monograph, the primary focus is on the relationship between vortex dynamics and turbulent flow characteristics. There are 14 separate chapters and 24 different contributors to this 300-page volume. Most of these involve mathematical analysis, but some involve numerical simulations and experimental results. Some of the papers are focused on the deterministic kinds of vortical motion that characterize eddy motions, while others relate these studies to the overall statistics of the turbulent flows, which can be measured more readily than the details of individual eddies. Only one of the papers is concerned exclusively with the statistical dynamics of turbulence.

The book will be of interest to theoretical physicists who are attempting to gain a deeper insight into the nature of turbulence, but there is little, if any, information here that can be readily translated into practical use by engineers. Unfortunately, a unified, comprehensive and comprehensible practical theory for turbulent flows is still awaiting us in the distant future.

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Layer of Protection Analysis: Simplified Process Risk Assessment

**Center for Chemical Process Safety (CCPS)
American Institute of Chemical Engineers (AIChE)**
New York, NY
279 pp., \$149
2001

This book has been written to describe the Layer of Protection Analysis (LOPA) risk assessment process, comparing its strengths and weaknesses to other quali-

tative and quantitative risk assessment processes. It covers the basic requirements for implementing the LOPA process, and features worked examples showing several different LOPA applications. The book has been an invaluable reference for us, as we have applied the LOPA process to our safety interlock assessments in conjunction with our process hazards analysis (PHA).

The chapters have been written with several audiences in mind — from overview chapters targeting executives who are expanding their corporate risk-assessment strategies, to detailed-step-oriented chapters with examples for safety specialists, process engineers and process control engineers involved in LOPA reviews. These chapters are well-written, well-organized and are easy to read.

LOPA is a good semi-quantitative tool for analyzing and assessing risk when simple issues are reviewed. The LOPA process addresses the key questions for protection layers that are identified in qualitative process hazards analysis studies:

1. How safe is safe enough?
2. How many protection layers are needed?
3. How much risk reduction should each layer provide?

These are the fundamental questions posed by the PHA teams. LOPA provides a consistent, simplified rule-based form of risk assessment to ensure that systems are in place to prevent or mitigate hazardous events.

The LOPA risk assessment is most useful when additional quantitative analysis beyond a qualitative analysis is needed. Typical qualitative assessments include Hazard and Operability Studies (HAZOPs), What if/Checklists, and Failure Mode and Effect Analyses (FMEAs). Typical quantitative risk assessments include Quantitative Risk Assessments (QRA), which include statistical and probabilistic modeling of frequency and consequences. Since the qualitative risk assessments may not generate a rational answer (emotionalism may play a big part in the assessment), and since quantitative risk assessments are rigorous, require specialized resources, and are excessive when applied to simple issues, the LOPA process offers a middle-ground for providing clarity and consistency.



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