The AIR Institute's Certified Extreme Event Modeler Program

MEETING THE GROWING NEED FOR TALENT IN CATASTROPHE MODELING & RISK MANAGEMENT

The increased focus on extreme event risk management by corporate boards, executives, rating agencies, and regulators has fueled a growing need for skilled catastrophe modelers. New regulatory regimes around the world require companies to demonstrate robust risk management practices and a comprehensive understanding of the modeling process and associated assumptions and uncertainties. That's why AIR Worldwide established the AIR Institute, with the mission to be a center of excellence for extreme event risk management training and education.

At the core of the Institute is the Certified Extreme Event Modeler Program, an intensive and interactive program designed to prepare the next generation of modelers for tomorrow's risk management challenges. More than just end-user training, the Program explores the inner workings of the models, delving into such topics as catalog generation, accounting for uncertainty, advanced analysis options, and interpreting model results.

Upon successful completion of the coursework and final exam, attendees become AIR Institute Certified Extreme Event Modelers™ (CEEM™), immediately prepared to add even more value to their organizations.

CATASTROPHE RISK MANAGEMENT PROFESSIONALS COMPLETING THE PROGRAM GAIN:

- A more detailed understanding of the science and technology underlying the models
- Skills in handling and optimizing the exposure data entering the models and software
- An appreciation of the impact of exposure data quality on the accuracy of modeled results
- In-depth knowledge of the nature of analysis options and assumptions and their impact on model results
- Efficiency in importing and exporting data and optimizing analysis run-times
- Ability to apply best practices in gathering and interpreting the output of model analysis
- Improved preparation for discussions with rating agencies
- Practical expertise with AIR's software applications, including modeling of complex business situations
- The background necessary to synthesize and communicate analysis results to senior management

THE BOTTOM LINE: An AIR Institute Certified Extreme Event Modeler will have the necessary tools to employ and communicate best practices in catastrophe management throughout organizations concerned with risk.

"Given the importance of catastrophe modelling within the insurance industry, I feel this course has enabled me to further understand—and even challenge—the AIR models in a more meaningful way."

DAN SPENCE, AGGREGATE MANAGER, ASCOT UNDERWRITING LTD.

WHO SHOULD ATTEND?

Anyone with responsibility for catastrophe risk analysis, management, and decision-making will benefit from the CEEM Program, including:

- Insurance financial managers
- Actuaries
- Underwriters
- Catastrophe modeling managers and analysts
- Insurance and reinsurance brokers
- Regulators

ADDITIONAL BENEFITS TO ATTENDEES

- Recognition as an AIR Institute Certified Extreme Event Modeler (CEEM)
- Eligibility for Continuing Professional Development credits from:
  - American Institute for Chartered Property Casualty Underwriters (CPCU)
  - American Academy of Actuaries (AAA)

BENEFITS OF EMPLOYING CERTIFIED MODELERS

- Better data quality control and validation to support internal and external catastrophe analysis
- Improved efficiency and throughput in the catastrophe modeling function
- Fuller scrutiny of sensitivity of the results to changes in modeling data and analysis assumptions
- New insights as modeling capabilities extend to more complex business and financing scenarios
- Crisper and clearer communication of the major conclusions regarding catastrophe risk

CEEM PROGRAM DETAILS

PROGRAM STRUCTURE

The CEEM Program's core curriculum consists of five full days of classroom learning. A mix of lectures, interactive demonstrations and hands-on exercises with AIR models and software will bring each of these topics to life for certification candidates.

The Program assumes prior knowledge of catastrophe modeling and the AIR software. Students who are unfamiliar with either of these, or who have never attended an AIR software training session, will be asked to complete a small number of prerequisite classes offered as online (on-demand) tutorials. These are designed to introduce the student to catastrophe modeling in general and AIR software in particular, and will help ensure that all attendees arrive with a suitable level of background knowledge.

Following the week-long core session, students will be required to take at least three elective sessions, which may be offered at AIR Client Conferences and online. These are designed to allow attendees to tailor their educational experience to suit their interests and needs, and to delve deeper into selected topics than is possible during the five days of classroom learning.

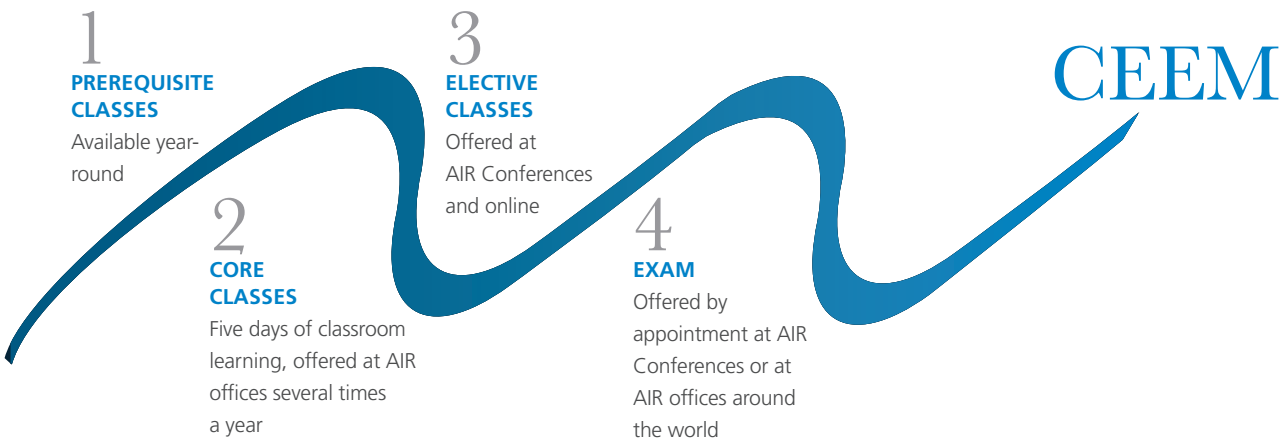
A comprehensive final exam will assess students' understanding of the Program material.

FACULTY

Each unit of the core curriculum is led by a senior AIR professional experienced in the relevant topics, many with PhDs in their fields. Instructors are supported by teaching assistants offering on-demand one-on-one tutorial support for the lectures and exercises. Periodic quizzes are also completed with faculty assistance to reinforce learning and retention.

LOGISTICS AND HOSPITALITY

Breakfast and lunch are provided on each of the five classroom days, with a welcome reception on Monday and a celebration dinner on Thursday. Dress code is casual. It is recommended that attendees arrive Sunday night and depart late afternoon or evening on Friday, as each day's activities begin at 9 a.m. and end about 6 p.m. local time.



PROGRAM STRUCTURE

CLASSES

PREREQUISITE CLASSES

Offered online, these sessions address the key concepts that students need to understand before attending the core classes.

INTRODUCTION TO CATASTROPHE MODELING

This session introduces Institute participants to key concepts underlying catastrophe models and modeling. We consider the history of the industry, the high-level framework of a catastrophe model, and the motivation for using models. The class also examines the current state of the catastrophe modeling industry and its likely future direction.

INTRODUCTION TO TOUCHSTONE®

This session provides an introductory-level tutorial on detailed loss analysis. It introduces the Touchstone user interface and explains the various screens and their contents. The session guides users through a typical loss analysis process, including the import of exposure data, assigning latitudes and longitudes to each exposure location, running the analysis, and exporting and interpreting the results. This class sets the scene for the Program's in-depth "Touchstone Under the Hood" class, which is offered as a core module.

INTRODUCTION TO CATRADER®

This session provides an introductory-level tutorial on the use of CATRADER for aggregated loss analysis. It introduces the CATRADER user interface and guides users through a typical loss analysis process, including the import of aggregated exposures and loss files, running the analysis, and exporting and interpreting the results. This class provides the background knowledge required for the Program's core "CATRADER Under The Hood" class.

The knowledge gained from these classes will be assessed by way of an online test. A passing grade is a prerequisite to attending the core and elective sessions.

CORE CLASSES

The centerpiece of the Program is the core curriculum – five days of classroom learning delivered at one of AIR's offices. The curriculum covers the material that all CEEMs should be expected to know, and provides the springboard for students to explore the elective classes. A sample list of the core classes, together with an overview of their contents, is on the overleaf. Each location where the AIR Institute is held offers the core classes that are relevant for the region.

ELECTIVE CLASSES

A number of sessions at each AIR Conference will be designated as "AIR Institute Program Electives." They will reflect the latest developments in the science behind the models and other aspects of catastrophe modeling. Students must take at least three elective classes either in person or through AIR's online portal. The knowledge gained from these classes will be assessed as part of the final CEEM Program exam.

CORE CLASSES

INTRODUCTION TO HURRICANE MODELING

Participants will learn about hurricane meteorology and how key variables are used to generate stochastic events. Storm intensity footprints, the impact of terrain on storm intensity, and the relationship between storm duration and fatigue failure will all be explored. The session will also discuss the impact of climate change and the uncertainty surrounding the quantification of its impact on landfall frequency and insured losses.

INTRODUCTION TO EARTHQUAKE MODELING

Why and where do earthquakes occur? How big are they likely to be? Why do they sometimes cause damage and sometimes not? What buildings are more vulnerable and why? This session examines the nature of earthquakes and the physical behavior of buildings subjected to ground motion. The topics covered will describe the AIR earthquake modeling process, from the analysis of historical seismicity, stochastic catalog generation, and the attenuation of seismic waves to the development of building damage functions, the analysis of secondary vulnerabilities such as soft-stories or corner buildings, and the estimation of loss. Through interactive exercises and in-classroom demonstrations, the participants will acquire an understanding of the earthquake modeling process, its challenges and its limitations. This session will also discuss the two major determinants of the damage caused by a tsunami and the effect of terrain on tsunami propagation.

INTRODUCTION TO EXTRATROPICAL CYCLONE MODELING

Participants will learn about where extratropical cyclones, or ETCs, form and the meteorological conditions that facilitate their development. This session will also investigate the primary energy sources that fuel ETCs and will explore the similarities and differences between ETCs and tropical cyclones. Participants will also gain insight into the methodology used to build AIR's stochastic catalog of storms.

INTRODUCTION TO SEVERE THUNDERSTORM MODELING

This session examines the three sub-perils (tornadoes, hail, and straight-line winds) that constitute a severe thunderstorm and the physical behavior of buildings subjected to these sub-perils. The topics covered include: the severe thunderstorm modeling process, from the "smart-smoothing" of the historical data set from NOAA's Storm Prediction Center; the generation of the stochastic catalogs; the 3-second gust wind speed and hail impact energy to the development of building damage functions; the analysis of secondary vulnerabilities such as roof age, pitch, covering, and attached structures; and the estimation of loss.

INTRODUCTION TO INLAND FLOOD MODELING

This session examines the nature of flood and the physical behavior of buildings, contents, and nonstructural components subjected to this peril. The session will cover the AIR inland flood modeling process, including: the simulation of realistic precipitation patterns, methodology for determining flood inundation depth, and simulation of levee failure. The session will also discuss how AIR defines a flood event; the component-based approach to the development of building damage functions; individual risk modifiers, such as foundation type (including basements) and contents vulnerability; and estimation of loss.

ATMOSPHERIC PERILS VULNERABILITY

Participants will learn how vulnerability functions are developed to create ground-up hurricane, severe thunderstorm, and extratropical cyclone losses. The impact of exposure characteristics on loss calculations will also be examined.

UNDERSTANDING EXPOSURE DATA

"Garbage in, garbage out" is a common refrain in catastrophe modeling. Simply put, if the exposure data being input to the models is incomplete or inaccurate, the models cannot be expected to generate accurate loss estimates. This session will focus on the impact of data quality on the analysis results. Techniques for assessing the completeness and reasonability of exposure data will be examined, as will the sensitivity of analysis results to value changes in selected exposure data fields. Hands-on exercises provide data handling lessons in realistic situations.

CORE CLASSES *continued*

TOUCHSTONE UNDER THE HOOD

In this session, participants will learn how Touchstone analyzes exposures to provide a robust, probabilistic view of catastrophe risk. After a review of Touchstone's architecture and user interface, a wide variety of analysis options will be examined and best practices discussed. The impact of certain assumptions, analysis option selections, and other factors on performance and on the modeled results will be considered. Special attention will be paid to the link between the software and the models, and the process by which losses are generated when the models run event catalogs against company exposures. Hands-on practice sessions will reinforce these concepts.

CATRADER UNDER THE HOOD

Users of aggregate exposures at the CRESTA or county level will learn how CATRADER provides a reliable view of catastrophe risk. This session includes discussion of the importance of industry exposures and losses to improve decision-making, and compares the CATRADER loss generation methodology to the detailed analyses performed in Touchstone. After a review of CATRADER's exposure module and data input capabilities, the impact of assumptions and the selection of program options on results will be explored. We also examine the inner workings of loss analyses in CATRADER and use practical exercises to reinforce the key concepts.

FINANCIAL MODELING AND UNCERTAINTY IN CATASTROPHE MODELS

Uncertainty is inherent in catastrophe modeling. This session examines the sources of uncertainty in damage estimates and explains how this uncertainty can be modeled using probability distributions. We also examine the process of applying insurance terms to these distributions in order to calculate insured losses in the stochastic modeling framework, and explain how multiple loss distributions can be combined to arrive at location-, policy- and portfolio-level loss estimates. Worked examples of particular scenarios will be discussed.

INTERPRETING MODEL RESULTS

A solid grounding in probability and statistics, along with a working knowledge of data management, is needed to properly interpret model results. This session provides the foundation candidates need to deploy best practices in interpreting model results. Aggregation of risk across regions and perils, validation of model results against historical data, sensitivity analysis to changes in data and assumptions, and the actuarial principles associated with the risk metrics produced by models are all discussed. We also look at the impact of demand surge, and demonstrate through worked examples how the computed event losses are combined to arrive at exceedance probability (EP) curves and loss probabilities.

REAL-TIME CATASTROPHE MODELING

Obtaining reliable catastrophe loss information quickly as an actual event unfolds has become increasingly important for insurers, reinsurers, and investors. This session will look in depth at the process of generating event sets in real time for AIR's ALERT service, and examines how the losses generated by the ALERT event sets should be interpreted and communicated to decision-makers.

CYBER MODELING

Cyber events are occurring more frequently, and an extreme manifestation could be catastrophic. Cyber policies or "all-risk" policies that include cyber coverage could subject your organization to cyber claims. This session gives an overview of AIR's approach to cyber modeling and our tools to help you manage your exposure to cyber risk.

PANDEMIC MODELING

The 1918 "Spanish Flu" pandemic was one of the greatest public health catastrophes in modern history. Caused by a readily transmissible and highly virulent strain of influenza, the pandemic killed between 20 million and 100 million people worldwide, at a time when the global population totaled just 1.8 billion. If such an event were to occur today, the insured losses could be unprecedented. Over the course of this session, attendees will learn how the AIR Pandemic Model goes beyond traditional epidemiological modeling to help you accurately assess your exposure and loss potential.

DATES, LOCATIONS, AND FEES

The core classes for the AIR Institute Certified Extreme Event Modeler will be offered at different times and locations throughout the year. Visit our website at www.air-worldwide.com/AIR-Institute for this year's schedule.

As seats are limited and in high demand, cancellations are not accepted once a seat is reserved. However, a paid registration may be deferred to a later session or transferred to another professional from the same organization.

The tuition for the CEEM Program is USD 5,000 per candidate, payable at time of registration. This covers the cost of all prerequisite, core, and elective classes. It also covers 50% of the full price of one seat at a future AIR conference.

We look forward to your attendance and to your joining the growing ranks of AIR Institute Certified Extreme Event Modelers!

REGISTRATION

Register online at http://www.air-worldwide.com/AIR-Institute.

CONTACT US

Please send all questions to us at education@air-worldwide.com.

The AIR Institute's Certified Extreme Event Modeler Program

AIR
A Verisk Business

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