

Law of Models and Animations

AWMA 2013

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Overview

- Environmental models in:
 - **Court/ Tribunals,**
 - Public communication,
 - Approvals



Models in court

- Law of evidence
- Demonstrative aids
- Admissible with permission
- Expensive but
- Picture can be worth 1000 words

Can be admissible if:

- Relevant
- Reliable
- Helpful to understand expert evidence
- Authenticated

Same principles as photos

- Does it accurately show the scene?
- How do you know?
- How can you prove it?
- Has it been altered?

For photos

- I took it
- I've kept the card/ film safe since then
- It accurately depicts what I saw at the time

For photos

- Altered?
 - Chain of custody?
- How dark?
- How fuzzy?
- Relevant vantage point?
- Inflammatory?

Models

- Same general principles
- But so much more can go wrong
- Inconsistent court decisions
- Model can be allowed in, but still not believed

Leading case

- *Owens v Grandell*, 1994
- Accident reconstruction
- Computer generated video-graphic animation

Admissible if can prove

- Source data accurately collected
- Data entered correctly
- Algorithms valid, appropriate
- Modifications valid
- Images: accurate
- Will help judge understand expert evidence

How accurate?

- Must show, through a foundation witness with firsthand knowledge, that the animation "fairly and accurately" represents the real thing at the relevant time
- *Greer v. Kurtz*, 2008

How accurate?

- In all relevant respects
- Laws of physics
- Photo realism not required
- But accurate in *everything* that matters
- Which can be hard to predict

How transparent?

- Must disclose all data
- And algorithm
- No “black box”
- Missing data: excluded

Did anyone check it?

- To err is human
- To really mess up, you need a computer
- GIGO



Just the facts, ma'am

- No speculation
- Eg *Greer*:
 - Accident reconstruction, *yes*
 - How it could have been avoided, *no*.

The real facts, please

- Eg *Lancaster v. Santos*
- Model showed car pointing SW,
 - actually SE
- Cab on road
 - actually in ditch
- 92 m slide
 - actually 80 m, etc.

But all the key ones

- *Crosby v Joyce*
- Accident reconstruction
- Showed only the two cars
- Not the traffic they were moving through
- Therefore misleading
- Rejected (\$\$\$)

Hard to do years later

- *Owens:*
- Road had changed in 3 years
- Not all original data precise
- Some not recognized as important at the time
- Some assumptions not proven
- Little weight

Worth the money?

- Amazingly expensive
- Hard to get right
- Challenging translation between experts
- Mixed record in court
- But can make complex things easier to understand

Explaining a spill



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Public Communication

- Treat it like court
- Relevant
- Transparent
- Accurate
- Helpful
- Do you really need it?

Don't oversell

- Suitable for audience?
- Will they believe it?
- Will they understand it?
- If they do, will it help?

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Their models

- Key task: not to justify a model, but to apply it
- Sometimes, to choose among options



Accurate or conservative?

- Who controls assumptions?
- Models are useful, but in close cases MOE can always assume you into non-compliance
- If disprove one, there is always another

Example

- Roadway fugitives
 - AP 42 not for use <10 mph
 - Assumed no road cleaning
 - Used <10 mph
 - Despite road cleaning
 - Predicted exceedance
- Building fugitives
 - How long is that door open?

To resolve disagreements

- Mastery of the model
 - Updates?
 - Guidance
- Better source data
- Principled analysis
- Consult EPA
- Ambient measurements

Other options?

- Measure it later
- Fix and then measure again
- Wait for new model?
- Appeal?



Bottom line

- Powerful
- Exciting
- Persuasive
- But expensive
- Response uncertain
- LOTS of pitfalls

Questions?

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