London Bridge is Falling Down

Scenario Description:

You are an analyst for the Omaha, NE city government. The mayor, concerned about the degrading transportation infrastructure in the city, has asked you to assess the risk of bridge failure to the city, after well-publicized bridge collapses in cities on the East Coast in 2024.

Assemble data from one or more reputable sources (State and national DOT, Army Corps of Engineers, etc.). Assess the risk of a bridge collapse event occurring over the next 5 years, using publicly available data. You should consider both the probability of such a collapse and the consequences – a small county road bridge collapse is less problematic than e.g. the I-80 bridge over the Missouri collapsing. What interventions do you recommend to minimize the risk?

Not Safe For Work

Scenario Description:

You are a statistical analyst for a company with both industrial/manufacturing and office spaces. Your safety officer recently read this article about office injury statistics and wants you to evaluate whether the company needs to implement stronger safety policies for office workers, as they are more likely to be injured through falls than non-office workers.

Assemble data from one or more reputable sources (Bureau of Labor Statistics, Centers for Disease Control, Occupational Safety and Health Administration) to assess the risk of on-the-job injury for office and non-office workers. Consider both the severity of the injury and the probability of occurrence.

The Power of Climate Change

Scenario Description:

You are an analyst working for an electrical utility. A manager at one of the power plants has recently approached you about climate resilience strategies. The power plant is situated along the Gulf of Mexico in Dauphin Island, AL, and uses the Gulf as an heatsink.

Currently, the plant is designed around the assumption that the temperature of the gulf will be below 85°F (this assumption was relatively reasonable when the plant was built in 1970). When the water temperature is above this point, the plant must operate at reduced capacity, as it cannot transfer additional thermal energy into the water.

Assemble data from one or more reputable sources (USGS, NOAA, US Energy Information Administration). Make an operational assessment of the risk that the plant will have to operate at reduced capacity during the next 5 years. Consider both the probability of reduced operating capacity as well as the timing of that capacity (e.g. you should also look at electrical usage during those periods).

Sharknado!

You are an analyst for an insurance agency concerned with increasing payouts for property damage with a warming climate. Your boss recently saw Sharknado (2013) while trying to battle insomnia, and has become concerned about the increased likelihood of shark-infested weather as severe weather events become more probable due to climate change.

Your boss's concerns about the possiblity of shark-infested storms cannot be countered with logic, but you might be able to convince them that very few storms even have shark-infestation potential.

Assemble data from one or more reputable sources (NOAA, USGS, etc.).
Assess the probability that tornadoes form in coastal areas (Atlantic, Pacific, and Gulf of Mexico) and move inward, compared to the probability that tornadoes form inland and move toward the coast. You should consider both the probability of a coastal -> inland tornadic event and the consequences – a F0 tornado is unlikely to have the power to lift sharks from the water, while an F5 tornado might have the ability to transport many sharks inland. How serious is the sharknado threat to your bottom line?

(Note that you should probably not mock your boss *too* much, because they don't like to be the butt of jokes.)