The Distance Fallacy in Fire Protection

Distance alone could put property insurers on the wrong road

Verisk


PPC is
9X more powerful
at predicting future fire loss
than distance to nearest fire
station alone.

When the simple answer isn't the best

It seems simple enough for a property insurer to measure the relative quality of fire protection for an address: Plot the distance to the nearest fire station. The closer the station, the faster the response time and the better the chances of containing damage in the event of a fire.

But the simple answer may not be the best. Suppose the property is in a sprawling rural municipality covered by a volunteer fire department. The nearest station, staffed around the clock, is three miles away—but in a neighboring town with no automatic-aid agreement to help save precious minutes.

The primary responding station for the address must wait for its volunteers to traverse several miles of country roads to reach the firehouse and then make their way to the address. A portable tank is deployed to receive water, which is pumped from a nearby river and shuttled to the scene by tankers.

This is not a far-fetched scenario, and it's just one pitfall of oversimplifying the assessment of fire protection. Verisk research has found that for one in five addresses, the responding fire station is not the closest.

Regardless of which station is the responding one, distance-based measures may miss an array of details that differentiate fire stations and their capacity to fight fires effectively. These factors in turn materially affect how accurately various metrics capture the relationship between quality of fire protection and ultimate loss experience.

Now there's data to corroborate the significant differences between a purely distance-based measure of fire protection and a more holistic approach such as that employed by ISO's Public Protection Classification (PPC®). In short, PPC is nine times more powerful than distance alone as measured by modeled versus actual experience.

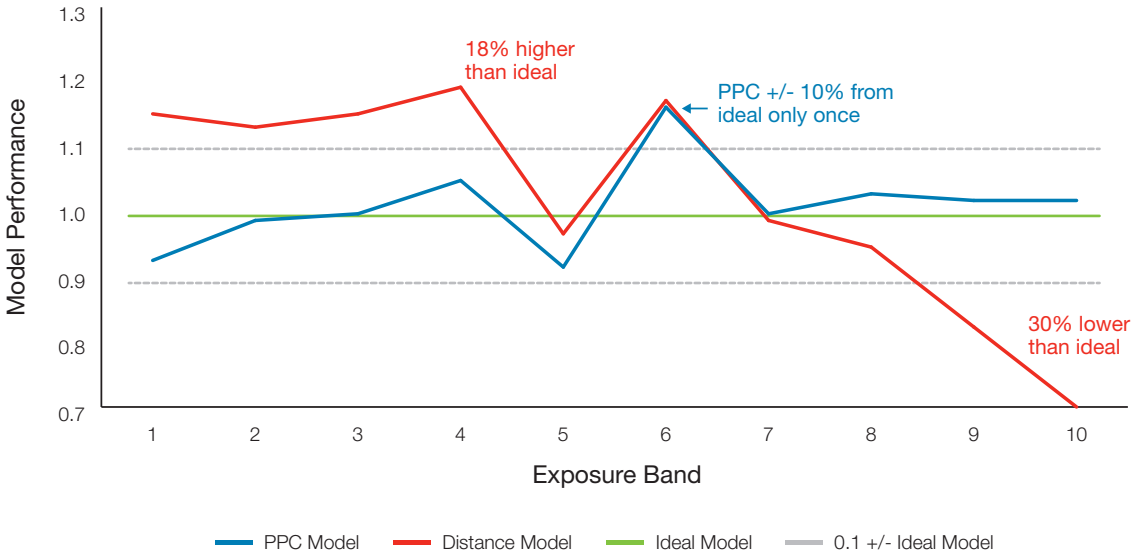
Solving for the right answer

Our analysis set out to gauge the effectiveness of distance and PPC separately and in combination with each other. All runs, encompassing almost 10 million exposures, included loss costs at current levels (LCCL) and construction type (frame versus masonry). Each of the ten exposure bands in the graph below contained the same number of exposures throughout.

Comparing PPC Head-to-Head with Distance

The chart below demonstrates the enhanced precision that PPC offers. The green line represents an ideal state, in which a loss projection model would produce a perfect rating 100 percent of the time. The blue line represents a model for PPC projected losses, whereas the red line shows a model for losses projected based only on distance. Using distance alone may drive pricing as much as 18 percent too high or 30 percent too low.

PPC Model performance versus Distance Model performance



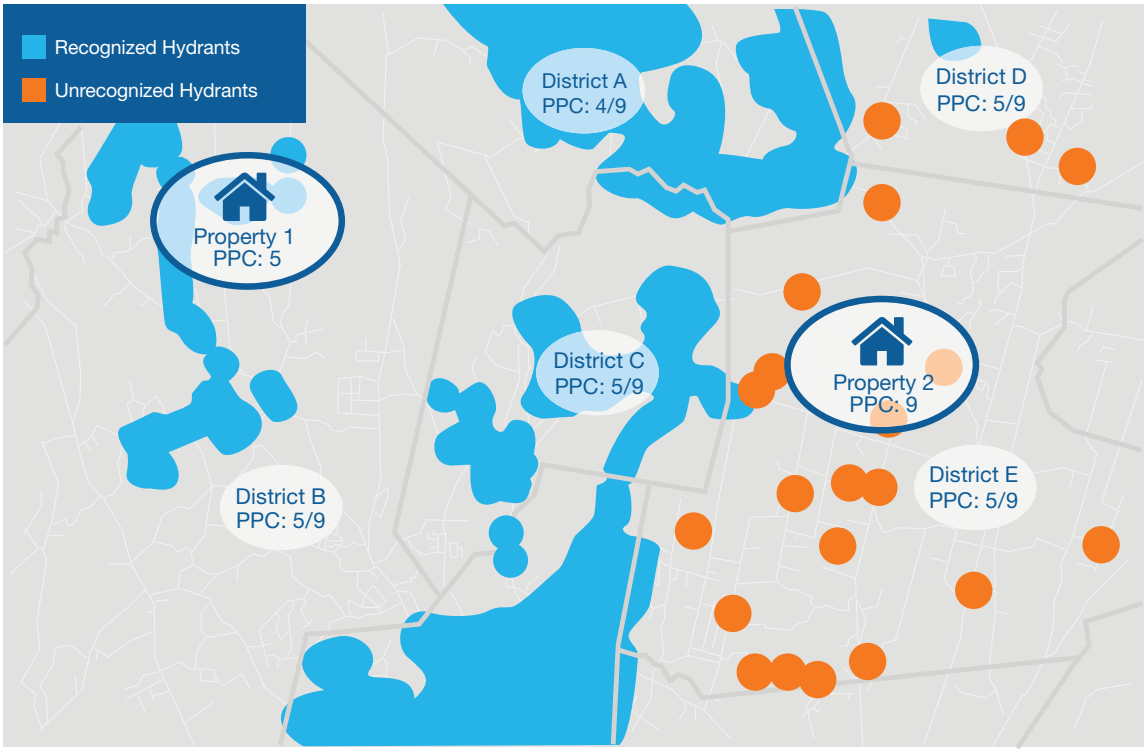
These findings enable us to quantify the power of PPC versus distance as we measure each, including the overlap or correlation where both are effective:

- Using distance, 70 percent of a book of business may be mispriced by 10 percent or more.
- Distance (with the PPC correlation) picks up 11 percent of the combined effect.
- PPC (with the distance correlation) picks up 97 percent of the combined effect of PPC and distance.

Thus, we conclude PPC is 9 times more powerful than distance alone.

The answer revealed: Why PPC is more powerful than distance alone

What does PPC do that distance does not? PPC delves into an array of characteristics that distinguish each community's fire protection and its relative ability to prevent and fight fires. For example, water supply systems for firefighting vary widely—from hydrants fed by municipal water utilities to tanker-shuttle systems that ferry water to fire scenes from remote locations.



Property 1 is in an area with good hydrants, and the PPC is 5. **Property 2** has hydrants nearby, but they can't deliver enough water to meet our standards. The PPC is 9. Only LOCATION® has countrywide information on recognized and unrecognized water sources.

Fire protection changes happen for many reasons, but ISO keeps track—and leaves users better equipped to align price with risk through the predictive power of PPC. Below are a few of the changes that we track:

Fire Department Improvements and Deteriorations

We monitor changes to facilities, apparatus, training, and more.

New Communities

Nearly 1.3 million new privately owned residential houses were completed in February 2018.1

New Construction of Large Buildings

We track new construction in existing communities to factor in the impact on capacity.

Community Budget Fluctuations

Fire protection staffing, equipment purchases, and cutbacks may be affected by budgetary decisions.

Water Supply

According to our research team, more than 400,000 new fire hydrants were added in 2016.

Automatic Aid

We track the number of departments that have agreements in place to provide aid to their neighboring communities. We've noted a 19 percent increase since 2013 in departments adding automatic aid.

The complexities of the fire service mean that, for property insurers, "good enough" isn't enough when assessing the quality of a community's fire protection. The difference between superficial and granular information applied to underwriting and rating decisions can materially affect loss experience—and, ultimately, profitability.

For more information, visit us online at www.verisk.com/PPC.

Our Methodology

The analysis started with ISO's loss costs at current levels (LCCL) without any PPC factors. Two models were then built: one including PPC and the other including distance. The distance used in the analysis was distance to the responding fire station rather than distance to nearest fire station. Previous analyses have shown that the nearest fire station is not the responding fire station 20 percent of the time. PPC is the only solution that specifically captures the responding fire station.

With the two models in hand, a two-way lift chart (shown previously) was generated comparing the performance of the two rating solutions.

About Verisk

Verisk Analytics (Nasdaq:VRSK) is a leading data analytics provider serving customers
in insurance, energy and specialized markets, and financial services. Using advanced technologies to collect and analyze billions of records, Verisk draws on unique data assets and deep domain expertise to provide first-to-market innovations that are integrated into customer workflows. We offer predictive analytics and decision support solutions to customers in rating, underwriting, claims, catastrophe and weather risk, global risk analytics, natural resources intelligence, economic forecasting, and many other fields.

We help customers make better decisions about risk, investments, and operations with greater precision, efficiency, and discipline. In the United States and around the world, Verisk helps customers protect people, property, and financial assets

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