PML – MFL – EML
What would be the best insurance loss metrics to apply?

What is the difference between EML and PML?

There are many definitions of “maximum loss metrics” within the insurance market.

In LEARISK reports, we inform the following (from smallest to largest):

- **PML (Probable Maximum Loss)**: Assumes likely conditions with partially effective safety systems.
- **EML (Estimated Maximum Loss)**: Worst-case scenario. Safety systems assumed non-functional, with extensive damage (fire, VCE, etc.).
- **MAS (Maximum Amount Subject)** or **TIV (Total Insurable Value)**: Total site loss — e.g., due to natural disasters or aircraft crashes.

A good risk report should estimate both EML and PML. These metrics give the underwriter a better understanding of potential loss severity.

The PML assumes that mitigating factors will be partially impaired or delayed, whereas the MFL assumes that all safeguards in place will fail to provide protection.

Other concepts are also used:

Some engineers consider MFL (Maximum Foreseeable Loss) to be quite similar to the EML described in this circular.

Others refer to NLE (Normal Loss Expectancy), which assumes that all existing protection systems are operational and functioning correctly.

In all cases, it is important that the report clearly defines the scope and assumptions of each concept used.

What factors determine when to use EML or PML?

The underwriter will decide which to prioritize, depending on their risk appetite.

Some insurers reinsure based on TIV (Total Inssurace Value), others on EML, and the most solvent or risk-tolerant may use PML.

Each insurer will use the metric they are most comfortable with according to their risk profile and solvency. Some insurers use different metrics for different lines of business.

The trust that the insurer has in the risk engineer also plays a role. If an insurer cedes the risk in a treaty using the PML (Probable Maximum Loss), the cedant can increase their percentage of retention and retain more premium. The PML also allows the cedant to write more of the risk and fully utilize their treaty capacity. However, the repercussions of the PML failing could be damaging to the solvency of the cedant.

The determination of PML/EML is marred with subjectivity because it depends on the experience of the surveyors and underwriters.

<u>What is the "PML Error"?</u>

A wrong PML estimate results in what is known as “PML error”, for example:

- Let’s assume a risk with a Maximum Allowable Loss (MAS) of \$10,000,000, but the PML is calculated as \$7,000,000, and a premium of \$20,000 is paid.
- When ceding to the treaty with a capacity of \$5,000,000 at a 50% quota share (50% proportional reinsurance), the cedant will use the PML value of \$7,000,000. In other words, for reinsurance purposes, the \$7,000,000 is considered as 100% of the sum insured.
- Both the Retention and Quota Share will be 50% x \$7,000,000 = \$3,500,000. Since the treaty capacity is \$5,000,000, a facultative reinsurance will be necessary for the difference of \$7,000,000 - \$5,000,000.
- If the contract had been based on MAS, facultative support would be needed for (\$10,000,000 - \$5,000,000) = \$5,000,000.

By not ceding much of the risk, the cedant is inadvertently retaining an unforeseen portion of the risk for which no premium has been set aside to cater for.

PML Error arises as a result of wrongly estimating the PML value. PML error can only be identified when a loss occurs. If the resulting loss is greater than the PML value, the cedant is obligated to give the original insured a full settlement.

EML/PML heavily influences risk retention, reinsurance needs, and thus pricing. EML/PML optimize reinsurance costs, which impacts the final premium.