IDEALIZE LOAD-DISPLACEMENT CURVE - MONOTONIC LOADING

This software uses the energy equivalence method to idealize the load-displacement curves obtained from **monotonic loading tests.**

Experimentally obtained load-displacement and **moment-curvatures** curves are idealized by the methods described in **Figure 1**. In Figure 1, the area under the bilinear curve is equated to the actual "experimental" curve, and the area of the hatched region A1+A2 is equal to the area of the hatched region A3".

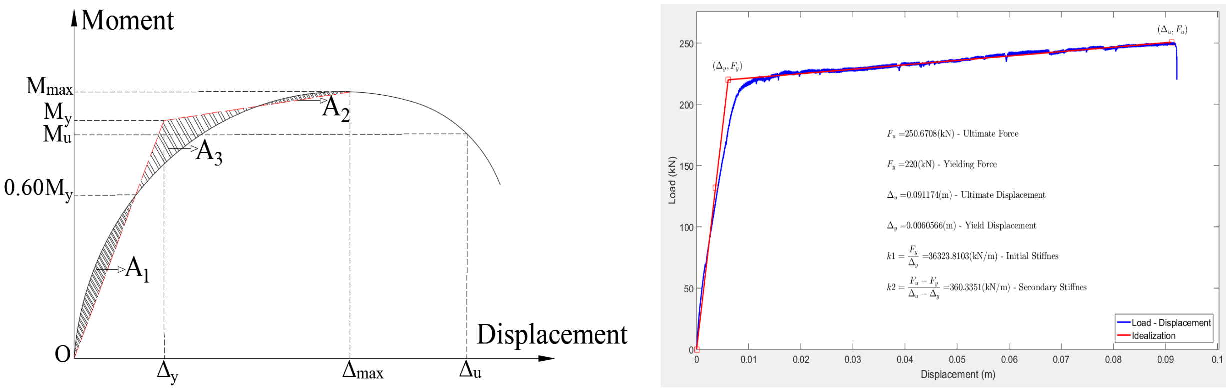

Figure 1: Energy equivalent method.

Once the load-displacement curves are idealized, the test results are summarized for;

- **Yield strength:** Yield strength is determined by using energy equivalence method and shown as $\mathbf{f_y}$.
- **Displacement at yield strength:** Displacement at yield strength is obtained from corresponding yield strength and shown as Δ_y.
- **Ultimate strength:** Ultimate strength is determined by using energy equivalence method and shown as $\mathbf{f_u}$. It should be noted that ultimate load is defined as 85% of the maximum recorded load.
- **Displacement at ultimate strength:** Displacement at ultimate strength is obtained from corresponding ultimate strength and shown as Δ_u.
- **Initial stiffness:** Initial stiffness is determined dividing the yield strength by the displacement at yield strength and shown as $\mathbf{k_1}$.
- **Secondary stiffness:** Secondary stiffness is determined by dividing the difference between the ultimate load and the yield load by the corresponding displacement differences and shown as $\mathbf{k_2}$.
- **Displacement ductility ratio:** Displacement ductility ratio is determined by dividing the ultimate displacement to yielding displacement and shown as $\mu_D = \frac{\Delta_u}{\Delta_y}$.
- **Ductility index:** The energy-based ductility index is determined as the ratio of the cumulative energy dissipation to the cumulative dissipated energy at the yield strength and shown as $\mu_E = \frac{E_u}{E_y}$.

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- **Cumulative energy dissipation capacity:** Dissipated energy capacities are determined by integrating the area under the load–displacement curves and shown as **E**.