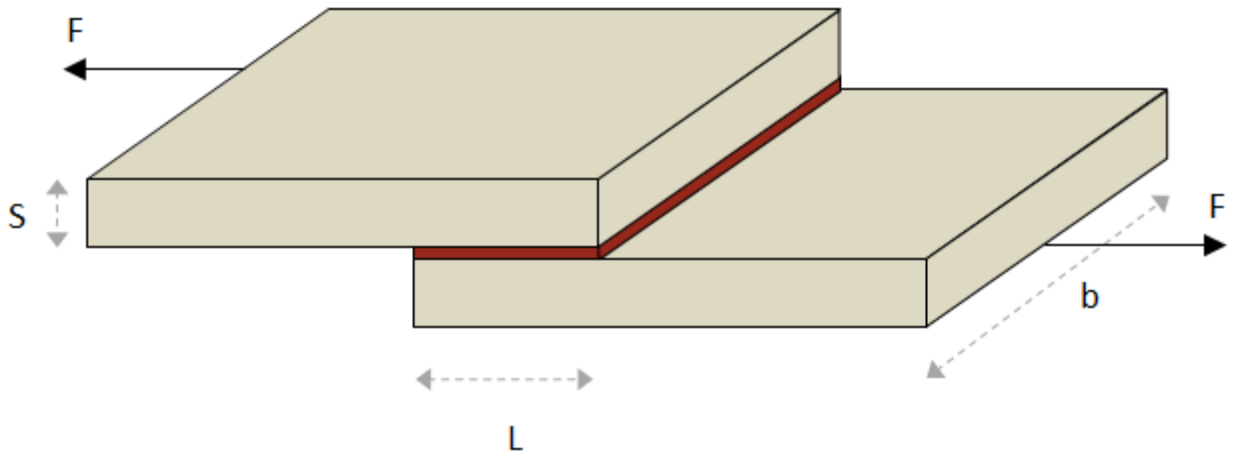
Wood Lap Joint Glue Strength



Parameters

Width	$b := 3.5\,\mathrm{mm}$
Thickness	$S := 0.75\,\mathrm{mm}$
Length of lap	$L := 3\,\mathrm{mm}$
Applied force	$F := 350\,\mathrm{N}$
Glue adhesive strength for tension	$S_u := 600\,\mathrm{MPa}$
Tensile strength of wood	$S_{ub} := 300\,\mathrm{MPa}$
Tension factor of safety	$k_s := 2$

Results

Allowed stress loading	$\tau_A := \frac{S_u}{k_s} = 300\,\mathrm{MPa}$

Applied joint shear stress $\tau := \frac{F}{b \cdot L} = 3.333 \times 10^{7}\ \mathrm{Pa}$

Minimum overlap length of adhesive glue surface $L_{min} := \frac{F}{b \cdot \tau_A} = 3.333 \times 10^{-4}\ \mathrm{m}$

Strength check of adhesive glue $\mathrm{evalb}\left(\tau \leq \tau_A\right) = \mathrm{true}$

Minimum length of overlap on wood strength $L_1 := \frac{S_{ub} \cdot S}{S_u} = 3.750 \times 10^{-4}\ \mathrm{m}$

Optimum overlap design length $L_{opt} := \max\left(L_{min}, L_1\right) = 3.750 \times 10^{-4}\ \mathrm{m}$

Reference:
Kent's Mechanical Engineers' Handbook 12th Edition: Design and Production Volume