$\mathrm{ORIGIN} := 0$ $l := 9\ ft$

Number of distributed loads: $z := 1$ $zz := 0..z$ $zz = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ $ll_{zz} := l = \begin{bmatrix} 9 \\ 9 \end{bmatrix}\ ft$

Start Load	End Load	Load start from R1	Load end from R1
$ws_1 := 1\ \frac{kip}{ft}$	$we_1 := 0\ \frac{kip}{ft}$	$zs_1 := 0\ ft$	$ze_1 := 18\ ft$
$ws_2 := 1\ \frac{kip}{ft}$	$we_2 := 0\ \frac{kip}{ft}$	$zs_2 := 9\ ft$	$ze_2 := 11\ ft$

Vector definitions:

$ws = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}\ \frac{kip}{ft}$	$we = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}\ \frac{kip}{ft}$	$zs = \begin{bmatrix} 0 \\ 0 \\ 9 \end{bmatrix}\ ft$	$ze = \begin{bmatrix} 0 \\ 18 \\ 11 \end{bmatrix}\ ft$
$ws_{zz} = \begin{bmatrix} 0 \\ 1 \end{bmatrix}\ \frac{kip}{ft}$	$we_{zz} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}\ \frac{kip}{ft}$	$zs_{zz} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}\ ft$	$ze_{zz} = \begin{bmatrix} 0 \\ 18 \end{bmatrix}\ ft$

Make sure loads don't extend past beam end

$zs_{zz} := \mathrm{if}\left(zs_{zz} \le l, zs_{zz}, l\right)$ $zs_{zz} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}\ ft$

$ze_{zz} := \mathrm{if}\left(ze_{zz} \le l, ze_{zz}, l\right)$ $ze_{zz} = \begin{bmatrix} 0 \\ 9 \end{bmatrix}\ ft$

Distributed load area

$A_{zz} := \left(\left(ze_{zz} - zs_{zz}\right) \cdot \left(.5 \cdot \left(we_{zz} + ws_{zz}\right) \cdot \frac{ft^2}{kip}\right)\right) = \begin{bmatrix} 0 \\ 4.5 \end{bmatrix}\ ft^2$

$A_{zz} := \mathrm{if}\left(A_{zz} \ne 0, A_{zz}, 0.0000000001\ ft^2\right)$ $A_{zz} = \begin{bmatrix} 1 \cdot 10^{-10} \\ 4.5 \end{bmatrix}\ ft^2$

Distributed load function

$f(x) := \left(\frac{\left(we_{zz} - ws_{zz}\right) \cdot \frac{ft^2}{kip}}{\left(ze_{zz} - zs_{zz}\right)}\right) \cdot x + ws_{zz} \cdot \frac{ft^2}{kip}$

Location of centroid from left side

$x_{zz} := \frac{1}{A_{zz}} \cdot \int_{zs_{zz}}^{ze_{zz}} x \cdot f(x)\, dx = ?$ $x_{zz} := \frac{1}{A_{zz}} \cdot \int_{zs_{zz}}^{\overrightarrow{ze_{zz}}} x \cdot f(x)\, dx = ?$ $x_{zz} := \frac{1}{A_{zz}} \cdot \int_{zs_{zz}}^{\overrightarrow{ze_{zz}}} x \cdot f(x)\, dx = ?$