

$$\begin{aligned}
 M_{TOT} &= \Delta_T \times L \times \alpha \times 12 \\
 J_{45} &= 1'' + ((T_{MAX} - 45^\circ) / \Delta_T) \times M_{TOT} \times \sin \theta \\
 J_{60} &= 1'' + ((T_{MAX} - 60^\circ) / \Delta_T) \times M_{TOT} \times \sin \theta \\
 J_{90} &= 1'' + ((T_{MAX} - 90^\circ) / \Delta_T) \times M_{TOT} \times \sin \theta
 \end{aligned}$$

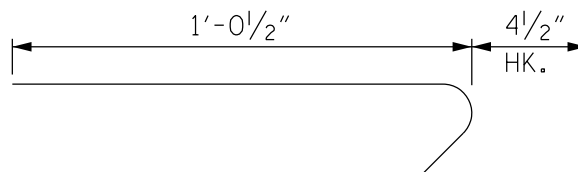
SEE FIGURE 6-43 FOR COEFFICIENT OF THERMAL EXPANSION (α) AND TEMPERATURE VALUES.

BENT 1

$$\begin{aligned}
 \text{TOTAL MOVEMENT} = M_{TOT} &= (100^\circ) (70' + 80') (6.5 \times 10^{-6} / ^\circ\text{F}) (12) \\
 \text{(ALONG } \underline{C} \text{ RDWY)} &= 1.170'' \\
 \\
 \text{PERPENDICULAR JOINT} &= 1'' + ((110^\circ - 45^\circ) / (100^\circ)) (1.170'') \sin 65^\circ \\
 \text{OPENING ,J, AT } 45^\circ \text{ F} &= 1.690'' = 1 \frac{11}{16}'' \\
 \\
 \text{PERPENDICULAR JOINT} &= 1'' + ((110^\circ - 60^\circ) / (100^\circ)) (1.170'') \sin 65^\circ \\
 \text{OPENING ,J, AT } 60^\circ \text{ F} &= 1.530'' = 1 \frac{1}{2}'' \\
 \\
 \text{PERPENDICULAR JOINT} &= 1'' + ((110^\circ - 90^\circ) / (100^\circ)) (1.170'') \sin 65^\circ \\
 \text{OPENING ,J, AT } 90^\circ \text{ F} &= 1.212'' = 1 \frac{3}{16}''
 \end{aligned}$$

BENT 2

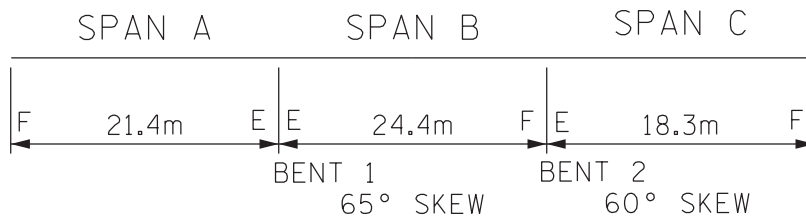
$$\begin{aligned}
 \text{TOTAL MOVEMENT} = M_{TOT} &= (100^\circ) (60') (6.5 \times 10^{-6} / ^\circ\text{F}) (12) \\
 \text{(ALONG } \underline{C} \text{ RDWY)} &= 0.468'' \\
 \\
 \text{PERPENDICULAR JOINT} &= 1'' + ((110^\circ - 45^\circ) / (100^\circ)) (.468'') \sin 60^\circ \\
 \text{OPENING ,J, AT } 45^\circ \text{ F} &= 1.263'' = 1 \frac{1}{4}'' \\
 \\
 \text{PERPENDICULAR JOINT} &= 1'' + ((110^\circ - 60^\circ) / (100^\circ)) (.468'') \sin 60^\circ \\
 \text{OPENING ,J, AT } 60^\circ \text{ F} &= 1.203'' = 1 \frac{3}{16}'' \\
 \\
 \text{PERPENDICULAR JOINT} &= 1'' + ((110^\circ - 90^\circ) / (100^\circ)) (.468'') \sin 60^\circ \\
 \text{OPENING ,J, AT } 90^\circ \text{ F} &= 1.081'' = 1 \frac{1}{16}''
 \end{aligned}$$



DETAIL OF #4 J1 BAR

EXPANSION JOINT SEAL EXAMPLE

STEEL BEAM SHOWN (CONCRETE BEAM SIM.)



$$M_{TOT} = \Delta \times T \times L \times \alpha \times 1000$$

$$J_7 = 25\text{mm} + ((T_{MAX} - 7^\circ) / \Delta_T) \times M_{TOT} \times \sin \theta$$

$$J_{16} = 25\text{mm} + ((T_{MAX} - 16^\circ) / \Delta_T) \times M_{TOT} \times \sin \theta$$

$$J_{32} = 25\text{mm} + ((T_{MAX} - 32^\circ) / \Delta_T) \times M_{TOT} \times \sin \theta$$

SEE FIGURE 6-43M FOR COEFFICIENT OF THERMAL EXPANSION (α) AND TEMPERATURE VALUES.

BENT 1

TOTAL MOVEMENT = M_{TOT} (ALONG CL RDWY) = $(55^\circ) (21.4\text{m} + 24.4\text{m}) (11.7 \times 10^{-6} / ^\circ\text{C}) (1000)$
= 29mm

PERPENDICULAR JOINT OPENING ,J, AT 7° C = $25\text{mm} + ((43^\circ - 7^\circ) / (55^\circ)) (29\text{mm}) \text{ SIN } 65^\circ$
= 42mm

PERPENDICULAR JOINT OPENING ,J, AT 16° C = $25\text{mm} + ((43^\circ - 16^\circ) / (55^\circ)) (29\text{mm}) \text{ SIN } 65^\circ$
= 38mm

PERPENDICULAR JOINT OPENING ,J, AT 32° C = $25\text{mm} + ((43^\circ - 32^\circ) / (55^\circ)) (29\text{mm}) \text{ SIN } 65^\circ$
= 30mm

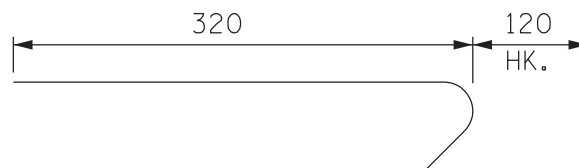
BENT 2

TOTAL MOVEMENT = M_{TOT} (ALONG CL RDWY) = $(55^\circ) (18.3\text{m}) (11.7 \times 10^{-6} / ^\circ\text{C}) (1000)$
= 12mm

PERPENDICULAR JOINT OPENING ,J, AT 7° C = $25\text{mm} + ((43^\circ - 7^\circ) / (55^\circ)) (12\text{mm}) \text{ SIN } 60^\circ$
= 32mm

PERPENDICULAR JOINT OPENING ,J, AT 16° C = $25\text{mm} + ((43^\circ - 16^\circ) / (55^\circ)) (12\text{mm}) \text{ SIN } 60^\circ$
= 30mm

PERPENDICULAR JOINT OPENING ,J, AT 32° C = $25\text{mm} + ((43^\circ - 32^\circ) / (55^\circ)) (12\text{mm}) \text{ SIN } 60^\circ$
= 27mm



DETAIL OF #13 J1 BAR

EXPANSION JOINT SEAL EXAMPLE

STEEL BEAM SHOWN (CONCRETE BEAM SIM.)

FIGURE 6 - 52 M