2.4.4.6 Assessment of surface crack widths

Where limitations are placed upon the desirable crack width, the design surface crack width, \( w \), for members reinforced with deformed bars may be assessed from the equation:

\[
w = 2.0 \beta' \frac{f_s}{E_s} g_s
\]

(Eq 2-7)

where \( \frac{f_s}{E_s} \) is the strain at the level of the reinforcement, determined by standard flexural theory for transformed elastic sections,

\( \beta' \), is a coefficient, given by:

\[
\beta' = \frac{y - kd}{d - kd}
\]

(Eq 2–8)

where

\( kd \) is the depth of the neutral axis, and

\( g_s \) is the distance from the centre of the nearest reinforcing bar to the surface of the concrete at the point where the crack width is being calculated, and

\( y \) is the distance from the extreme compression fibre to the fibre being considered

For the case where a crack width is being calculated between two bars the critical value of \( g_s \) is given by:

\[
g_s = \sqrt{\left( \frac{s}{2} \right)^2 + c_m^2}
\]

(Eq 2–9)

where

\( c_m \) is the cover distance measured from the centre of the bar to the surface of the concrete, and

\( s \) is the centre-to-centre spacing of the bars