The evaluation of the attenuation of ground motion amplitude is an essential problem for strong ground motion prediction. The attenuations of the P- and S-waves were estimated in the areas of mining districts in South Africa, using induced local events located in the distance range varied from 3km to 120 km and the depths of events were less than 3 km. The body waves quality factors, \(Q_p^{-1}\) and \(Q_s^{-1}\) values are estimated by using coda normalization method. The strong observed frequency dependency of the quality factors is modelled using the \(Q^{-1} (f) = Q_o^{-1} f^{-n}\) parametric model. Coda amplitude was obtained from the root-mean-squared amplitude for a 5 sec time window at the lapse time 16 sec for events located closer than 30 km and a time window of 10 sec and lapse time 60 sec for events in the range 60 km to 120 km. The obtained values of \(Q_p^{-1}\) vary from 0.017 to 0.0031 and of \(Q_s^{-1}\) from 0.012 to 0.0013 in the frequencies ranging from 3 to 24Hz. The frequency dependent relationships of \(Q_p^{-1}\) and \(Q_s^{-1}\) for the three components of P- and S-waves are expressed as:

\[
\begin{align*}
Q_{p-Z}^{-1} &= 0.046 f^{-0.86}, \\
Q_{p-N}^{-1} &= 0.0780 f^{-1.1}, \\
Q_{p-E}^{-1} &= 0.0318 f^{-0.885} \\
Q_{s-Z}^{-1} &= 0.026 f^{-0.82}, \\
Q_{s-N}^{-1} &= 0.0215 f^{-0.86} \\
Q_{s-E}^{-1} &= 0.023 f^{-0.92}.
\end{align*}
\]

The frequency dependence of parameters are calculated for a set geometrical spreading constant, \(\gamma\) is fixed at unity for distances less than 60 km and at 0.75 for distances in the range between 60km to 120km.