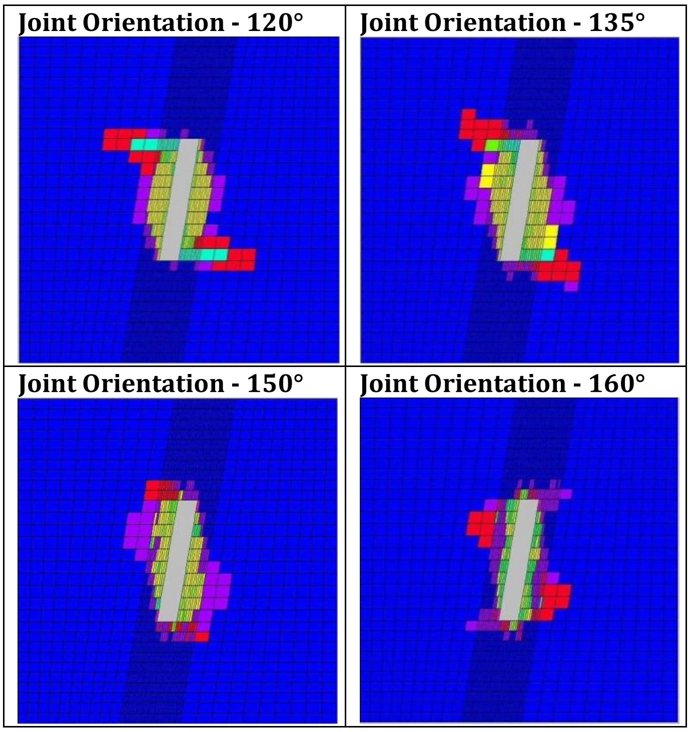

Figure 6. Images illustrating variation in the failure behavior at different joint orientations at Joint Tension 0.2MPa & k=2

6. CONCLUSIONS

An open stope is a large underground structure which is needed to stand upright for a long duration or till the mining activities is completed. The stability of the structure is affected if a joint is present near to the stope. The effect of joint orientation is studied in this research and following conclusions can be made upon thorough analysis.

(1) Value of k has a considerable effect on the stability of the stope. When the horizontal stresses are more than vertical, major failure occurs at the center of the stope and the sill and crown pillars face maximum failure when vertical stress is more than horizontal stress.

(2) Failure behavior shows a gradual behavior when joint tension ranges from 1MPa to 0.8MPa and then from 0.4MPa to 0.2MPa. In former values it shows a similar pattern in failure and the latter two shows a similar behavior. It can be concluded that as the cohesion decreases, the rate of failure increase.

(3) An elliptical shaped failure zone is formed around the stope which shows that immediate wall in hanging and footwall experiences maximum depth of failure. Also, the major axis of the ellipse orients parallel to the orientation of the joint plane.

(4) Maximum failure is observed when the orientation of joint plane is parallel to the stope surface, i.e., 60° to 135° with an exception at 105° where, in some cases, a sudden fall in failure depth is observed.

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