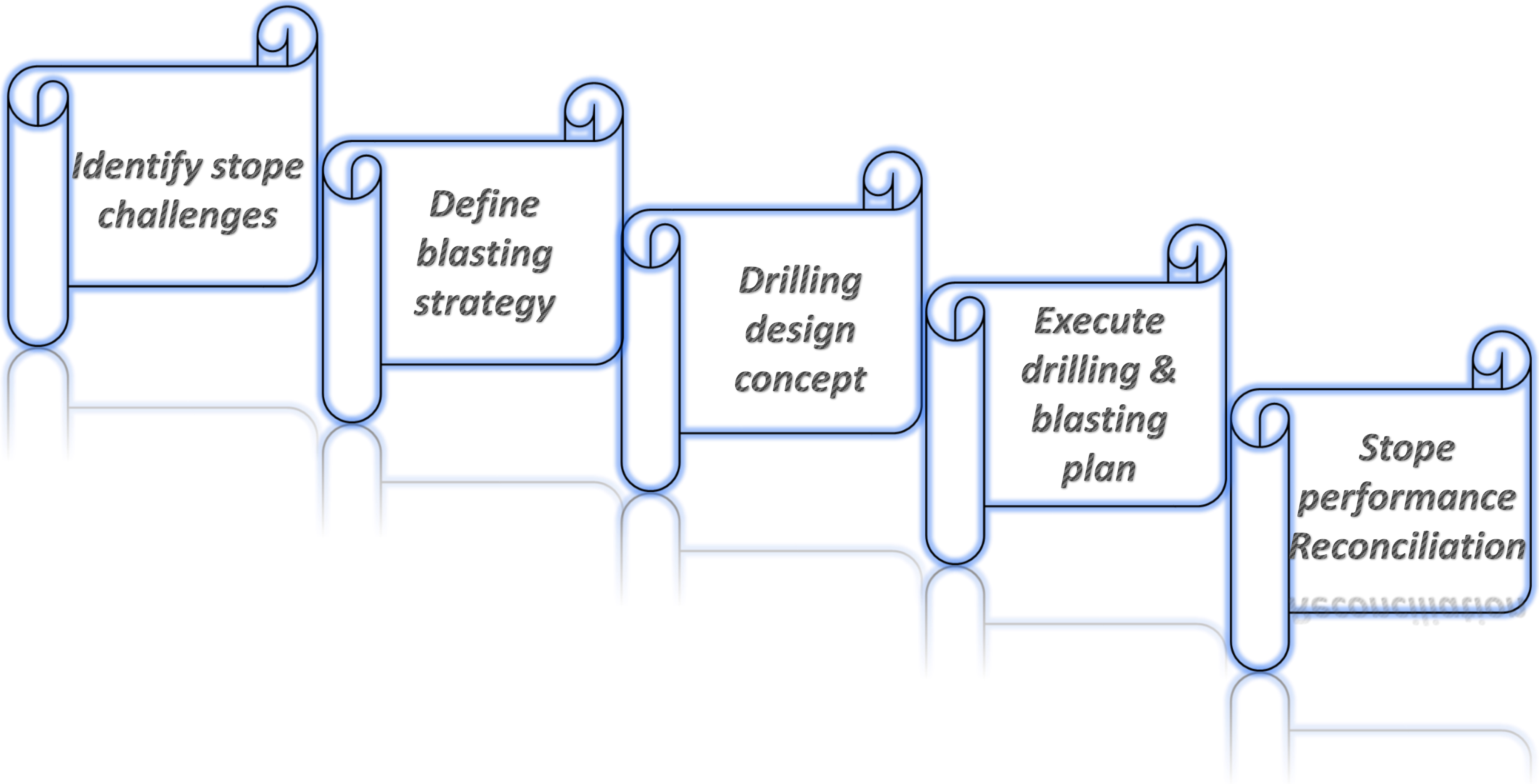
Stope blasting performance located underneath paste fill mass with a high risk of experiencing a structurally controlled gravity driven failure mode

INTRODUCTION

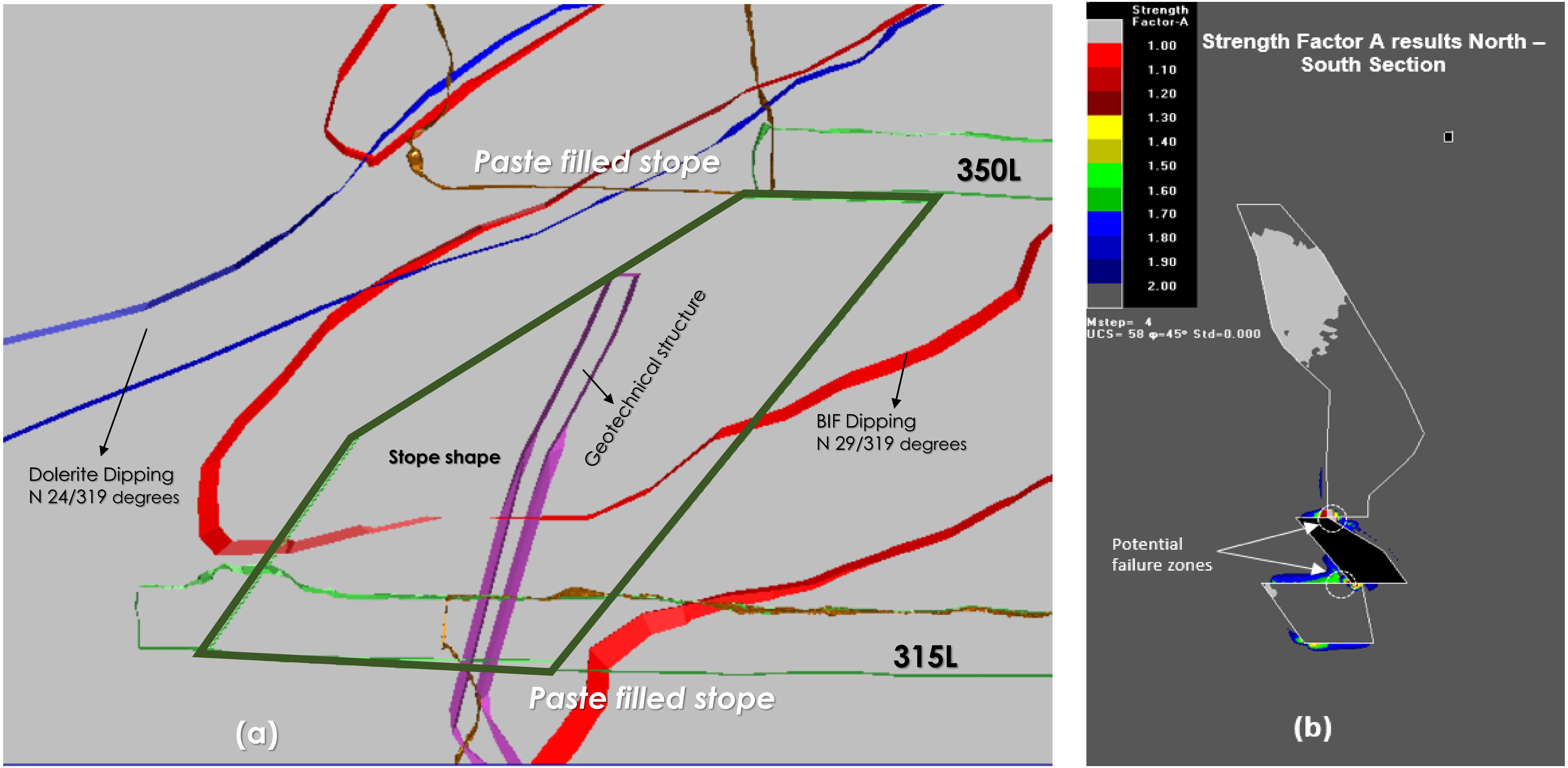
- A Gold mine performed a blasting on a primary stope mined out from 315 level upwards 350 level.
- During the stope stability assessment, it was found that there would be a high risk of experiencing a "structurally-controlled gravity-driven failure mode" due to the critical flat joint (36º/337º) recorded in the upper section of the HW during the face and window mapping.
- Based on the geological configuration, the stope will be having both Dolerite dyke (24º/319º) & Banded Iron Formation (29º/319º) exposed in the HW stope face. All these lithological units are nearly dipping parallel to the stope face forming therefore set of laminations (rock type contacts) that can easily be detached during the stope firing (blasting induced effects).
- The stope is positioned between two mined out stopes. To avoid exposing the crown face underneath paste fill mass, the HW was adjusted forming a triangle corner that can potentially fall and lead to paste dilution.

METHODOLOGY



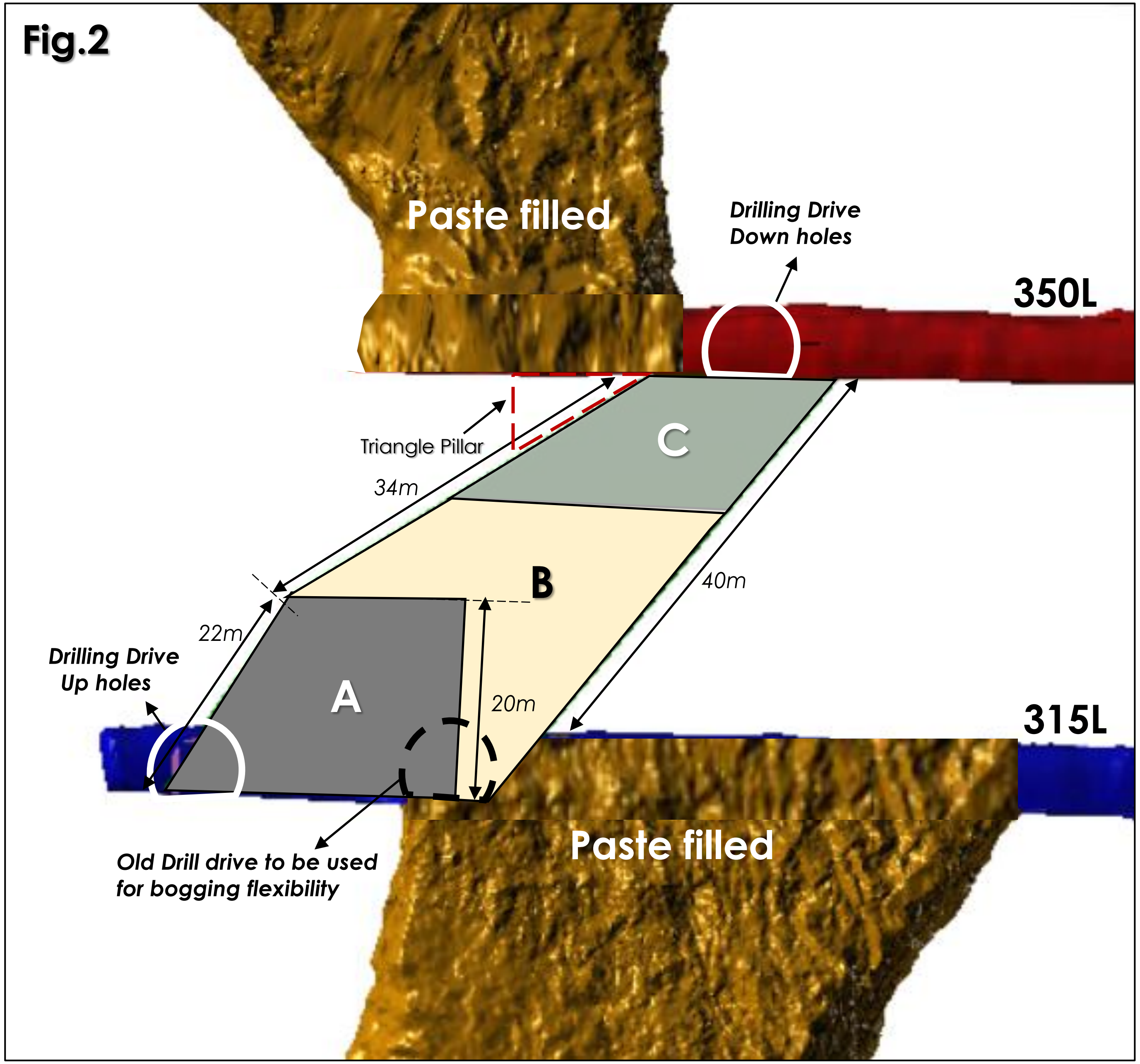
STOPE CHALLENGES

Fig.1



BLASTING SEQUENCE & MINING STRATEGY

Fig.2

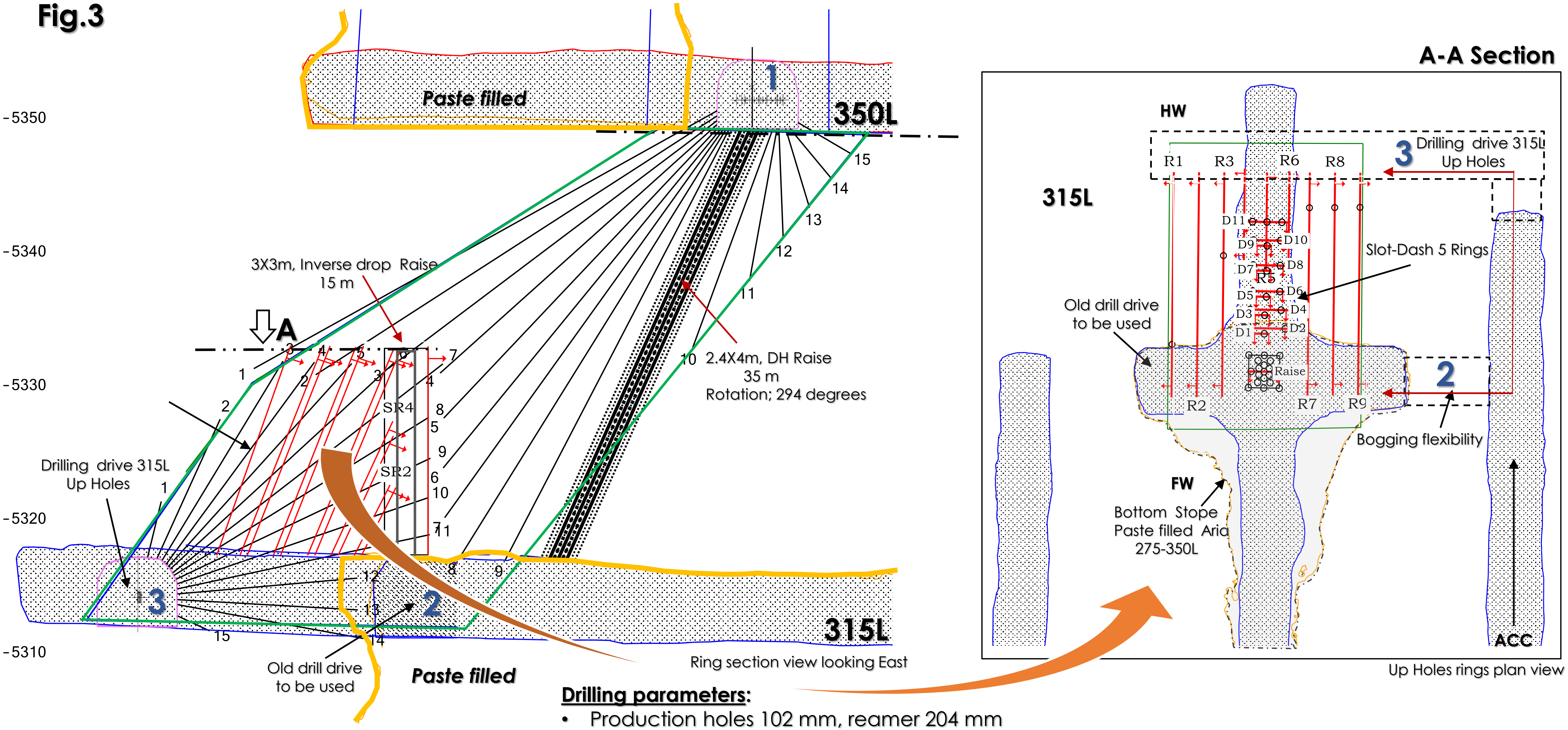


- A:19050 Tons planned to be taken with Up holes to open the stope from 315l(loading level)
- B: 25140 Tons planned to be taken with Down holes from 350L
- C: 15323 Tons planned to be taken with Down holes from 350L.

This portion was the most critical and needed to be well managed . Tough QAQC recommended to avoid any failure.

CONCEPTUAL DRILLING DESIGN

Fig.3

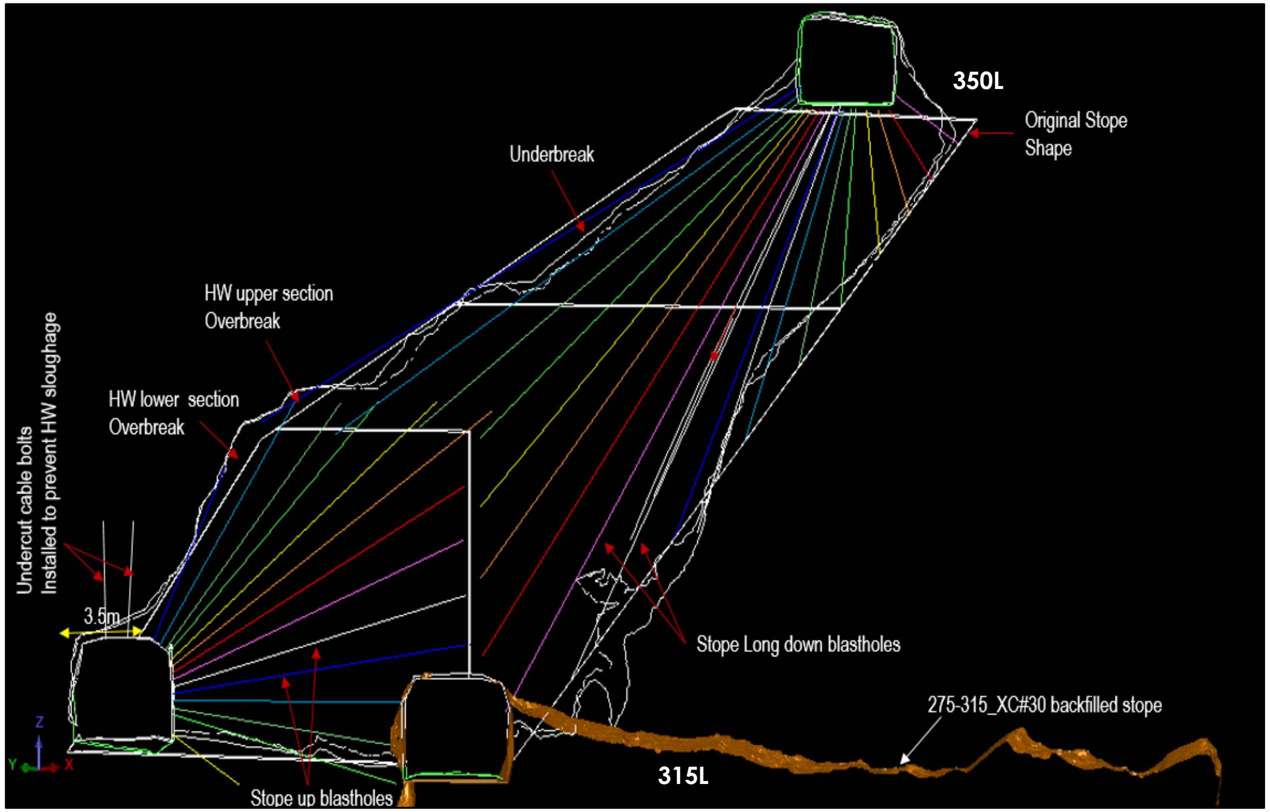


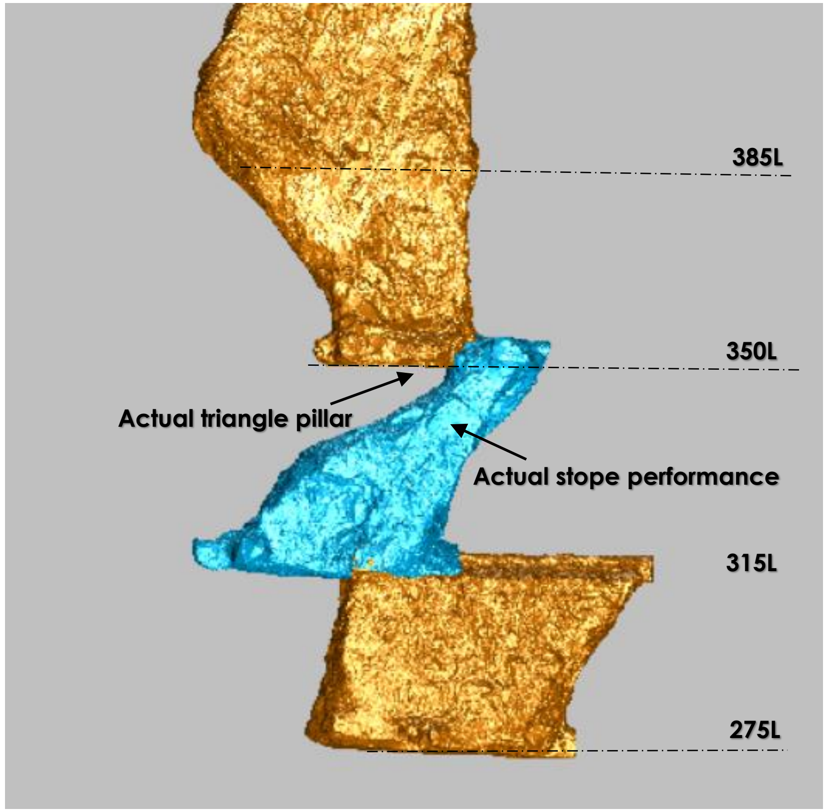
Drilling parameters:

- Production holes 102 mm, reamer 204 mm
- Burden: 2.5 m
- Spacing: 2.8 m

STOPE PERFORMANCE RECONCILIATION

Fig.4





Low energy explosives and adequate delaying were used to blast the production holes located near a shallow dipping hanging wall of stope in order to reduce damages due to vibration and to keep safe the triangle pillar.

Good performance of the stope in term of stability despite geotechnical challenges shows that, blast sequencing was the key for achieving safe and economic production during mining of this critical stope.

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