Improving Volume Reconciliation Using Drone Technology in the Open Pit Mining Industry in Ghana - a Case Study

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SUMMARY

The advent of drone technology in the surveying field has made complex estimation tasks simple, fast and reasonably accurate in the mining industry. Classical surveying methodology has also proven tedious, cumbersome and occasionally unsafe. A contractor was engaged to continue mining a cutback which had been started by another contractor. There was a challenge due to the pushback that was done on the already mined out pit. A huge interface was created that allowed materials to roll down into the bottom of the mined out pit. The new contractor had to mine the loose material generated by the previous contractor at a fee whiles the loose material generated by themselves was to be free of charge. Estimating the extra materials added on by the new contractor was a challenge so the company acquired a Vertical Take-off and Landing (VTOL) drone to assist in that delicate volumetric survey. The estimation was done by comparing the monthly new loose material introduced into the pit and the total volumes of new loose materials mined in the pit on monthly basis. Ideally, the two figures should sum up equally but due to material losses and factors beyond control, there was a marginal difference of 4%. The total estimated reel material mined in the project was 535,906.04 BCM whereas total estimated loose material added within the same period was 515,494.51 BCM. This results could not have been achieved without the use of the drones surveying the walls to pick details of materials perching on the walls. It would also have been impossible with the classical terrestrial survey technology in the form of GPS and Total Station available. The only challenge was the size of the file which was difficult to manage on an ordinary computer.