Comment on the paper 'Bed blending design incorporating multiple regression modelling and genetic algorithms'

by M. Kumral

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by G.K. Robinson*

The conclusion from this paper which I consider to be of greatest practical importance is that windrow stacking leads to a much greater variance reduction than chevron stacking. For instance, in his conclusion, Kumral writes: 'One can clearly observe that the windrow method is more efficient than the chevron method.'

I do not believe that this conclusion is correct. I believe that windrow stacking has an advantage over chevron stacking only when segregation is a problem. The conclusion is not consistent with the modelling reported in Robinson (2004), but a comparison between the modelling methodologies is not straightforward because that paper emphasized the end effects, which cause grade variation as the ends of stockpiles are reclaimed. (It should also be noted that all the modelling discussed in both papers ignores segregation.)

The point that I wish to make here is that Kumral's conclusion is not consistent with his own model.

Consider the building of a 36 kiloton stockpile in 9 stacker passes using Kumral's model, with the pile to be reclaimed in four reclaim slices. For chevron stacking, this is modelled as 36 blocks of ore, as in Figure 1, which is based on Kumral's illustration of chevron stacking in his Figure 1(a) but with 9 stacker passes rather than 4.

33	34	35	36
32	31	30	29
25	26	27	28
24	23	22	21
17	18	19	20
16	15	14	13
9	10	11	12
8	7	6	5
1	2	3	4

Figure 1—Diagram of chevron stacking of 36 blocks of ore to be reclaimed in four reclaim slices. Blocks are numbered in the order in which they are stacked

Each block is 1000 tons and is stacked over a quarter of the length of the stockpile. Its distribution over the width of the stockpile is not considered in the model.

The reclaim slices each consist of 9 blocks. They correspond to the columns in Figure 1.

Kumral's Figure 1(b) illustrates windrow stacking of the same 36 kilotons of material using a windrow stacker in 9 stacker passes, with the intention that the pile will be reclaimed in four reclaim slices.

These two models, one for chevron stacking and one for windrow stacking, have the same block sizes and the same sizes for reclaim slices. The sets of blocks, which get combined to form the four reclaim slices, are precisely the same for the two models. The first reclaim slice consists of the blocks 1, 8, 9, 16, 17, 24, 25, 32 and 33. The second reclaim slice consists of the blocks 2, 7, 10, 15, 18, 23, 26, 31 and 34. The third reclaim slice consists of the blocks 3, 6, 11, 14, 19, 22, 27, 30 and 35. The fourth reclaim slice consists of the blocks 4, 5, 12, 13, 20, 21, 28, 29 and 36. Hence the models give precisely the same predictions for blending performance.

This equivalence holds whenever the number of stacker passes is the same for the chevron and windrow models. It is not consistent with Kumral's conclusion that windrow stacking leads to a much greater variance reduction than chevron stacking.

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