

# Suspension and infiltration of copper concentrate in a gravel bed: a flume study to evaluate the fate of a potential spill in a Chilean river

Por: [Bustamante-Penagos, N](#) (Bustamante-Penagos, N.)<sup>[1,2]</sup>; [Nino, Y](#) (Nino, Y.)<sup>[1,2]</sup>

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## Abstract

This paper shows the advances of an experimental study of the spill of copper concentrate into immobile gravel beds. The purposes of this research are to identify the dynamics of the copper concentrate as it spills in gravel bed rivers due to mining pipeline accidents, and to quantify loads of transport in suspension and bed infiltration experimentally. The sedimentation process is generated downstream of the spill, inducing the infiltration into the bed. We have found two types of infiltration: unimpeded static percolation, when the pore size is larger than the size of copper concentrate into the substrate, or bridging layer, when the size of copper concentrate is larger than the pores in the substrate. For large fluvial sediments,  $d_{90s}/d_{50c} > 47$ , the infiltration of the copper concentrate reaches a state of unimpeded static percolation. Moreover, when the size of the granular material is small,  $d_{90s}/d_{50c} < 28$ , the bridge layer avoid free infiltration of the copper concentrate. The maximum length of the bed on which we could make measurements is limited by the dimensions of the flume. About 50% by weight of the copper concentrate infiltrates in to the bed within a distance equal to 100 flow depths, downstream from the point where the spill was generated. Due to its high density, ultimately, the copper concentrate must completely infiltrate into the bed.

## Palabras clave

**Palabras clave de autor:** [Unimpeded static percolation](#); [Bridging](#); [Copper concentrate](#); [Suspension load](#); [Mining accident](#)

## Información del autor

### Dirección para petición de copias:

*Universidad de Chile Univ Chile, Dept Civil Engr, Blanco Encalada 2002, Santiago, Chile.*

*Universidad de Chile Univ Chile, Adv Min Technol Ctr, Santiago 2007, Chile.*

**Dirección correspondiente:** Bustamante-Penagos, N (autor correspondiente)

 Univ Chile, Dept Civil Engr, Blanco Encalada 2002, Santiago, Chile.

**Dirección correspondiente:** Bustamante-Penagos, N (autor correspondiente)

+ Univ Chile, Adv Min Technol Ctr, Santiago 2007, Chile.

#### Direcciones:

+ [ 1 ] Univ Chile, Dept Civil Engn, Blanco Encalada 2002, Santiago, Chile

+ [ 2 ] Univ Chile, Adv Min Technol Ctr, Santiago 2007, Chile

**Direcciones de correo electrónico:** [nataliabustamante@ug.uchile.cl](mailto:nataliabustamante@ug.uchile.cl)

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