

1.1.1 4.3.2 Tailings Consolidation Analyses

Large strain consolidation analyses were undertaken to predict time to consolidation for the tailings. Analyses were completed using CONDES0, a large strain consolidation analysis software (Yao and Znidarcic 1997). Modeled cases included surcharge loading of different thicknesses of tailings, and also sensitivity analyses for time to consolidation under different loads.

Inputs to the model include results of hydraulic conductivity – consolidation testing for tailings conducted for this study. The lower boundary condition is considered to be drained, and the upper boundary condition is a surcharge load and phreatic surface.

Modeled cases included a surcharge loading of 300 kPa applied instantaneously to tailings at an initial solids content of 56% under double drained conditions. Results are summarized in Table 4-3. Time to completion of consolidation is taken as the time to stop of deformation, rather than dissipation of pore water pressures.

Table Error! No text of specified style in document.-1: Time of Consolidation for Tailings at 56% solids under 300 kPa Surcharge

Initial Thickness (m)	Final Thickness (m)	Time for Consolidation (days)
1	0.576	8
2	1.15	16
5	2.87	64
10	5.72	256

The change of the thickness of the tailings layer with time is plotted in Illustration 2. The water expelled from the tailings as consolidation occurs is plotted in Illustration 3. The change in the deformation of the tailings as a percentage of the final deformation is plotted in Illustration 4. The predicted pore water pressure for the scenario of a 2 m thick layer of tailings is plotted in Illustration 5. Pore pressure measurements using piezometers installed in freshly deposited tailings could be used to control the rate of construction and rise of the IMWF to maintain stable conditions.

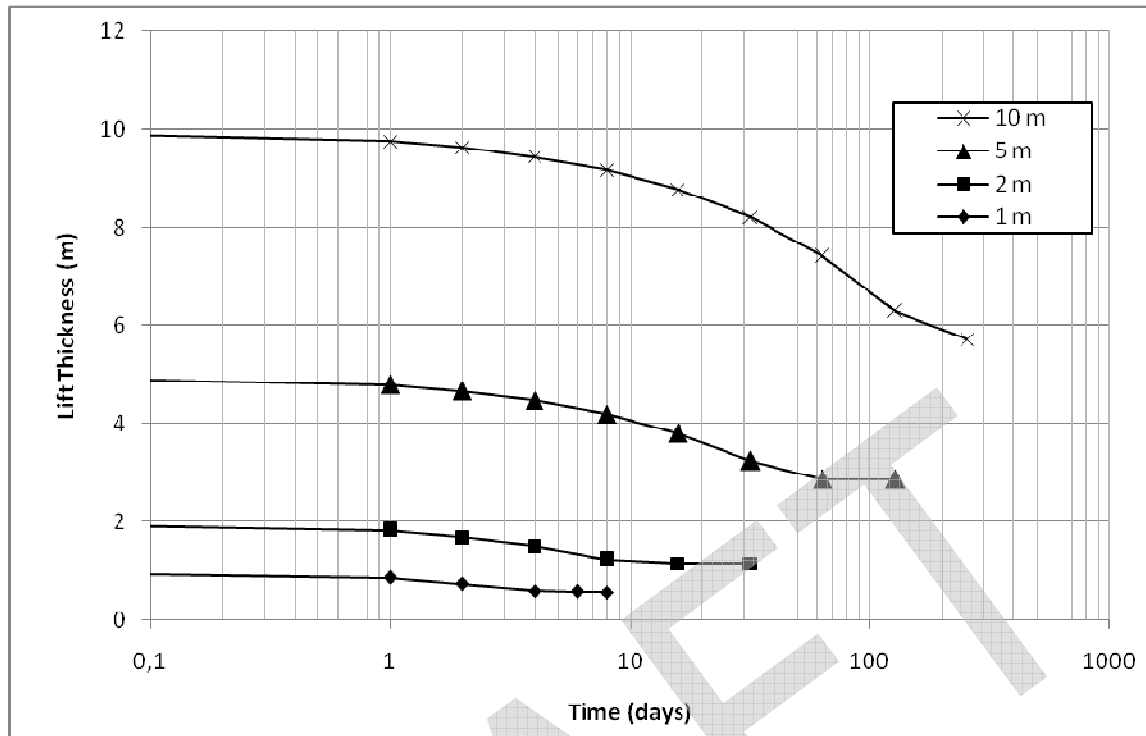


Illustration 1: Tailings Thickness with Time For 300 kPa Surcharge

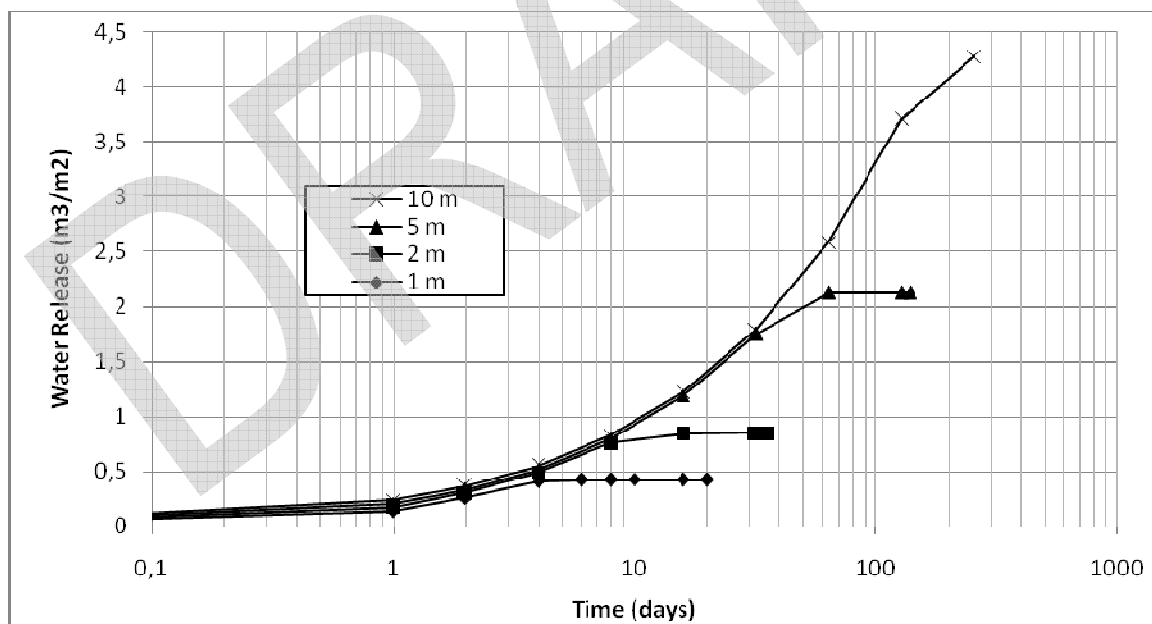


Illustration 2: Type picture title here.

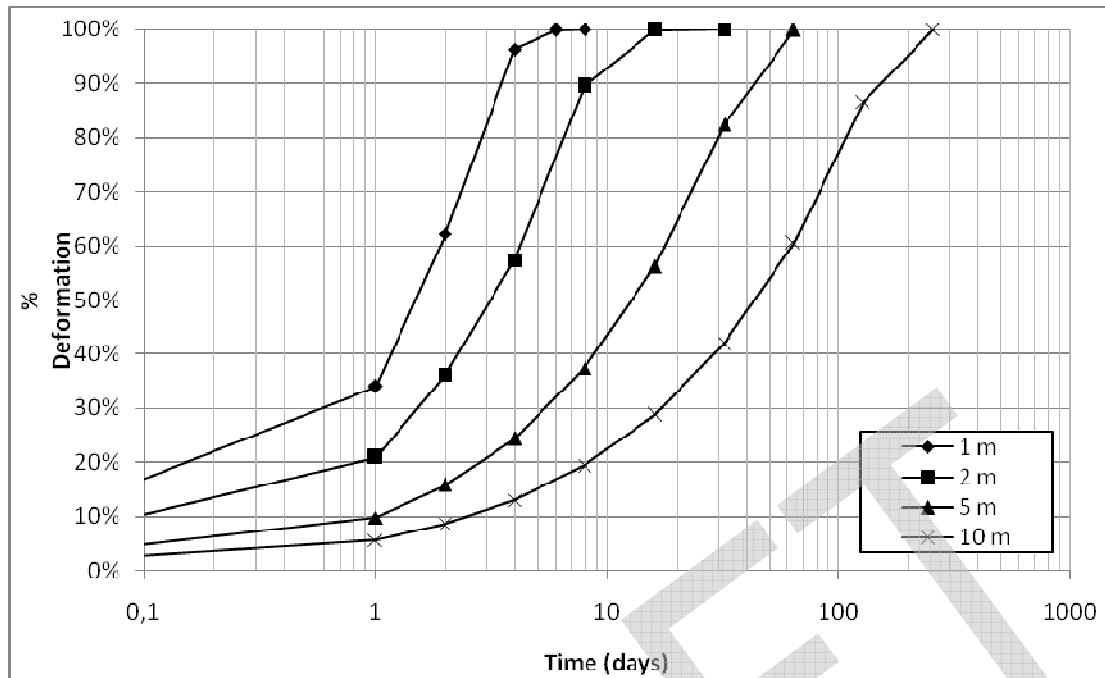


Illustration 3: Progress of Consolidation for 300 kPa Surcharge

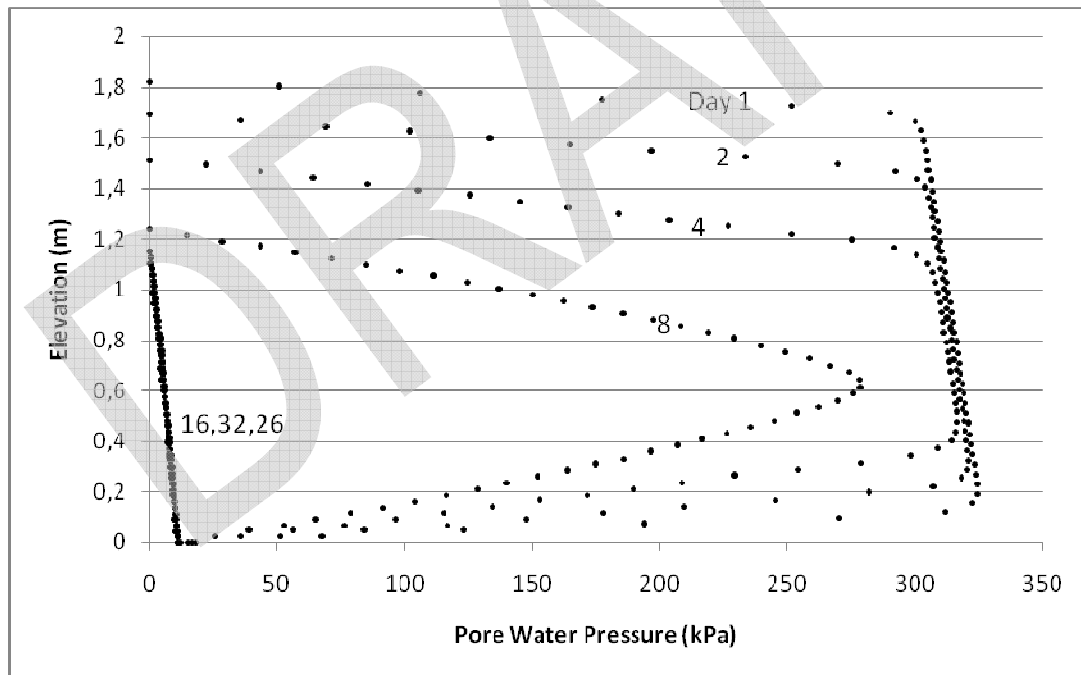


Illustration 4: Pore Water Pressure Change during Consolidation of 2 m Tailings with 300 kPa Surcharge

Results of sensitivity analyses for time of consolidation for a 2 m thick layer of tailings at an initial solids content of 56% with respect to different loading conditions are tabulated in Table 4-4 and plotted in Illustration 6. Models assumed double drainage conditions.

Table Error! No text of specified style in document.-2: Time of Consolidation for 2 m Thick Tailings Layer

Initial Thickness (m)	Surcharge Load (kPa)	Final Thickness (m)	Time of Consolidation (days)
2	50	1.32	33
2	100	1.25	25
2	300	1.15	16

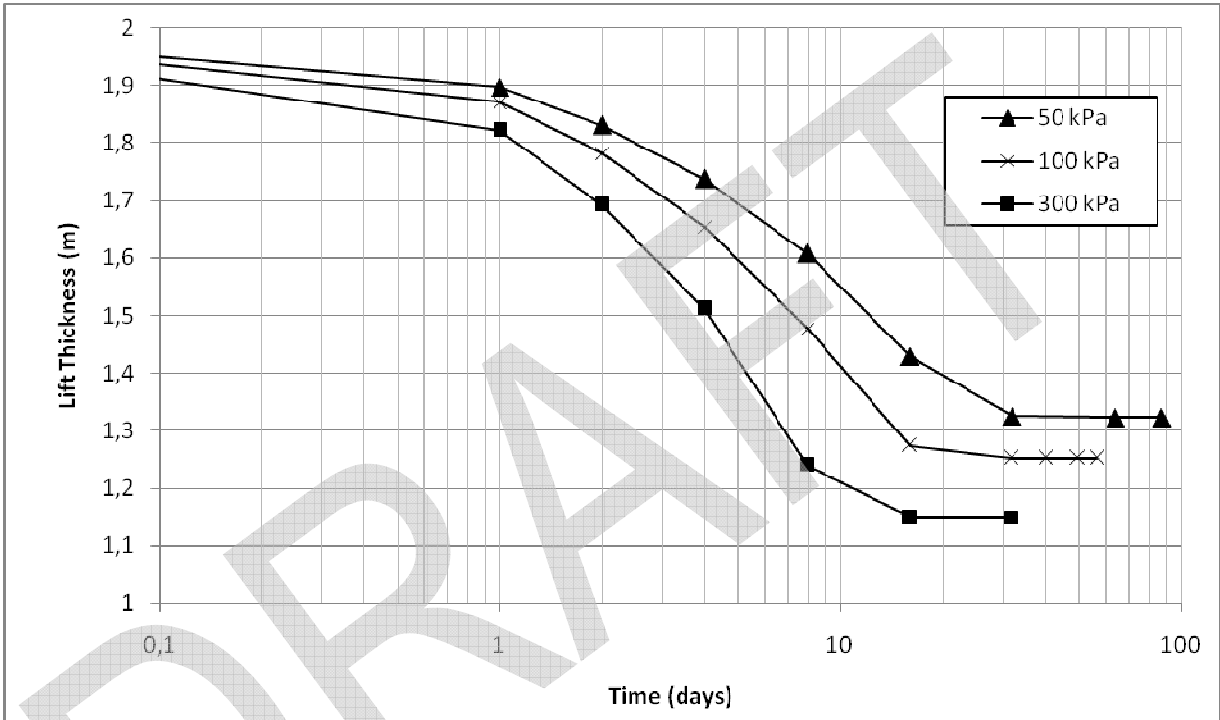


Illustration 5: Consolidation of 2 m Tailings Layer with Time for Different Surcharge Loads