

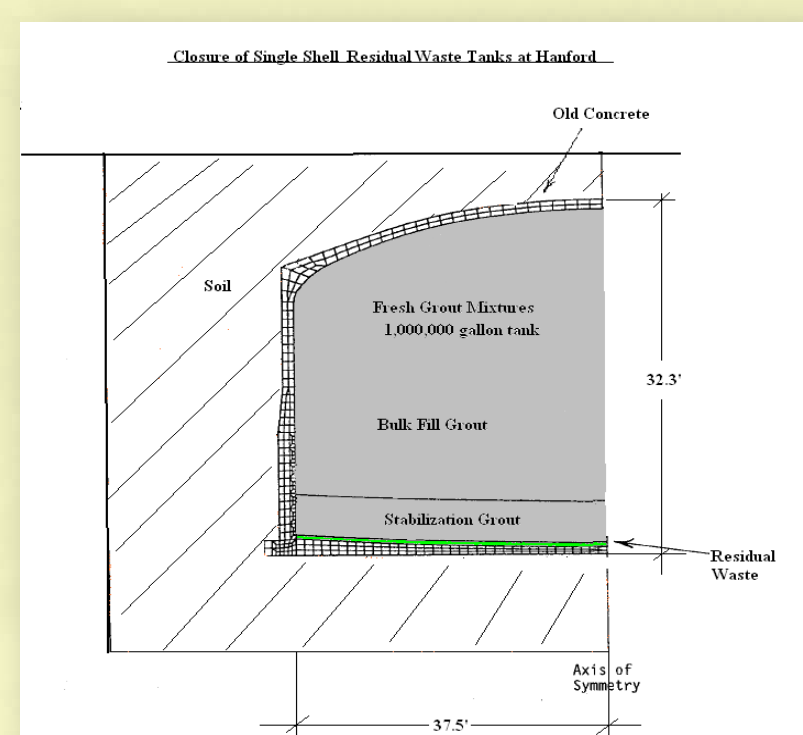
TEMPERATURE ANALYSIS OF MASS GROUT POURS FOR SINGLE SHELL TANK CLOSURE

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 Special Acknowledgement to: Leonel L. Lagos, Ph.D., PMP®

INTRODUCTION:

Operations at the Hanford site have left 55 million gallons of mixed waste stored in 177 underground tanks, 149 of them being single shell tanks (SST). These SSTs were built between 1943 and 1964 (Roelant, 2007). Due to mechanical weathering and extended use, some tanks have leaked. Plans for tank closure are underway, involving the removal and treatment of waste followed by stabilization of the tank structures.

OBJECTIVE:

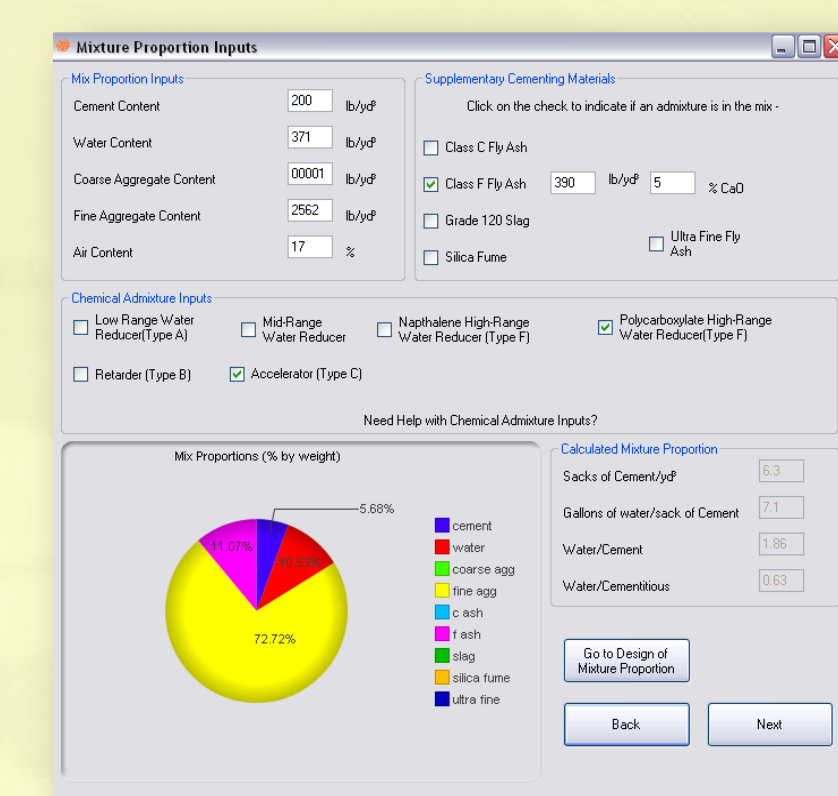


The objective of this investigation is to determine if the maximum temperature expected during tank closure using the bulk fill grout formulation will be below levels of concern, thereby reducing or eliminating operational constraints associated with the temperature rise in the grout pour.

RESEARCH DESCRIPTION:

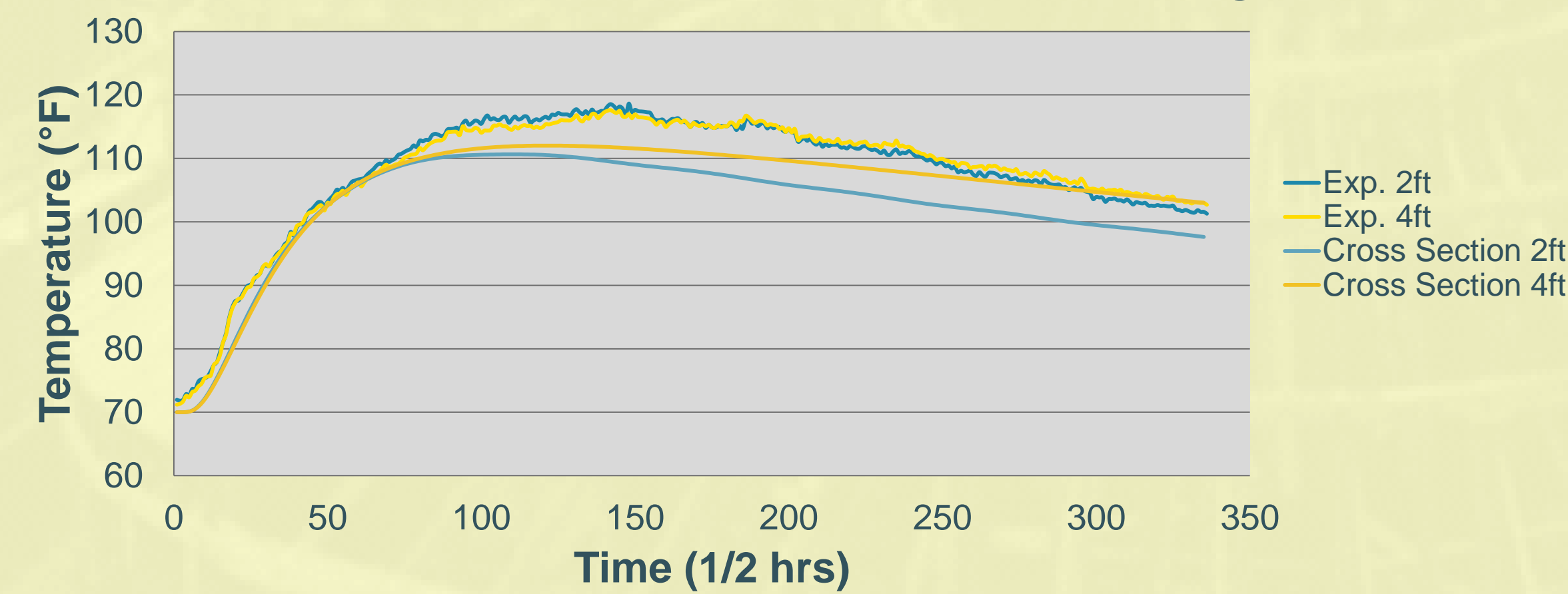
Elevated temperatures during curing can cause an increase in porosity and a decrease in compressive strength (Gajda, 2006). There are standard maximum temperatures for concrete but none for grout. A software package called ConcreteWorks V2 was used to predict temperature values over a 14 day period.

SELECTION OF METHOD:

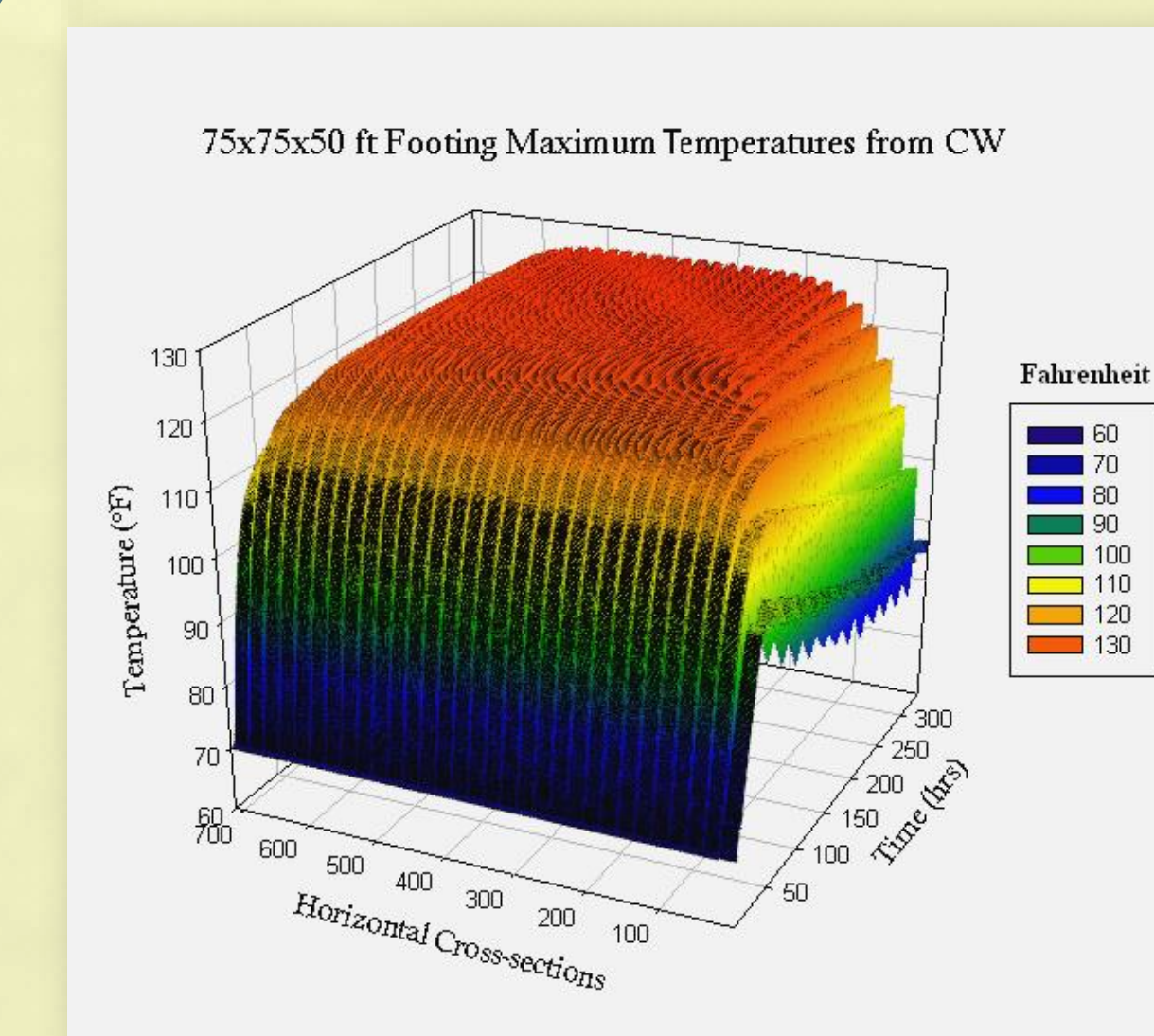


A diligent search was conducted for an efficient method or tool that can be used to predict grout curing temperatures. ConcreteWorks V2 proved to be the best accessible tool. Its versatile mixture proportions and easy-to-use graphical user interface allowed us to input our specific recipes. ConcreteWorks also allows us to input weather data and duration of analysis.

6ft dia. Cylinder Experimental Results vs. ConcreteWorks Theoretical 6x6x6 ft Footing



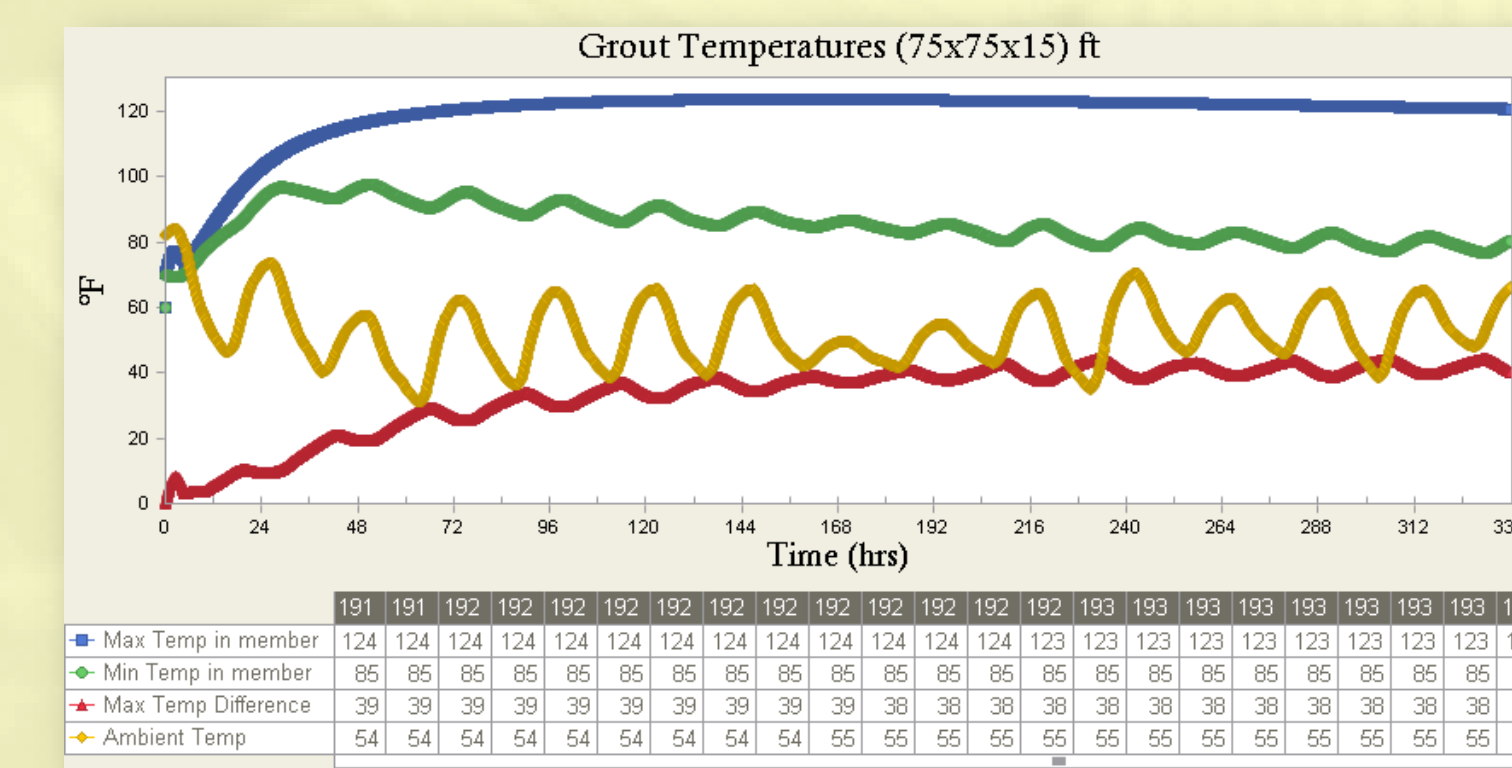
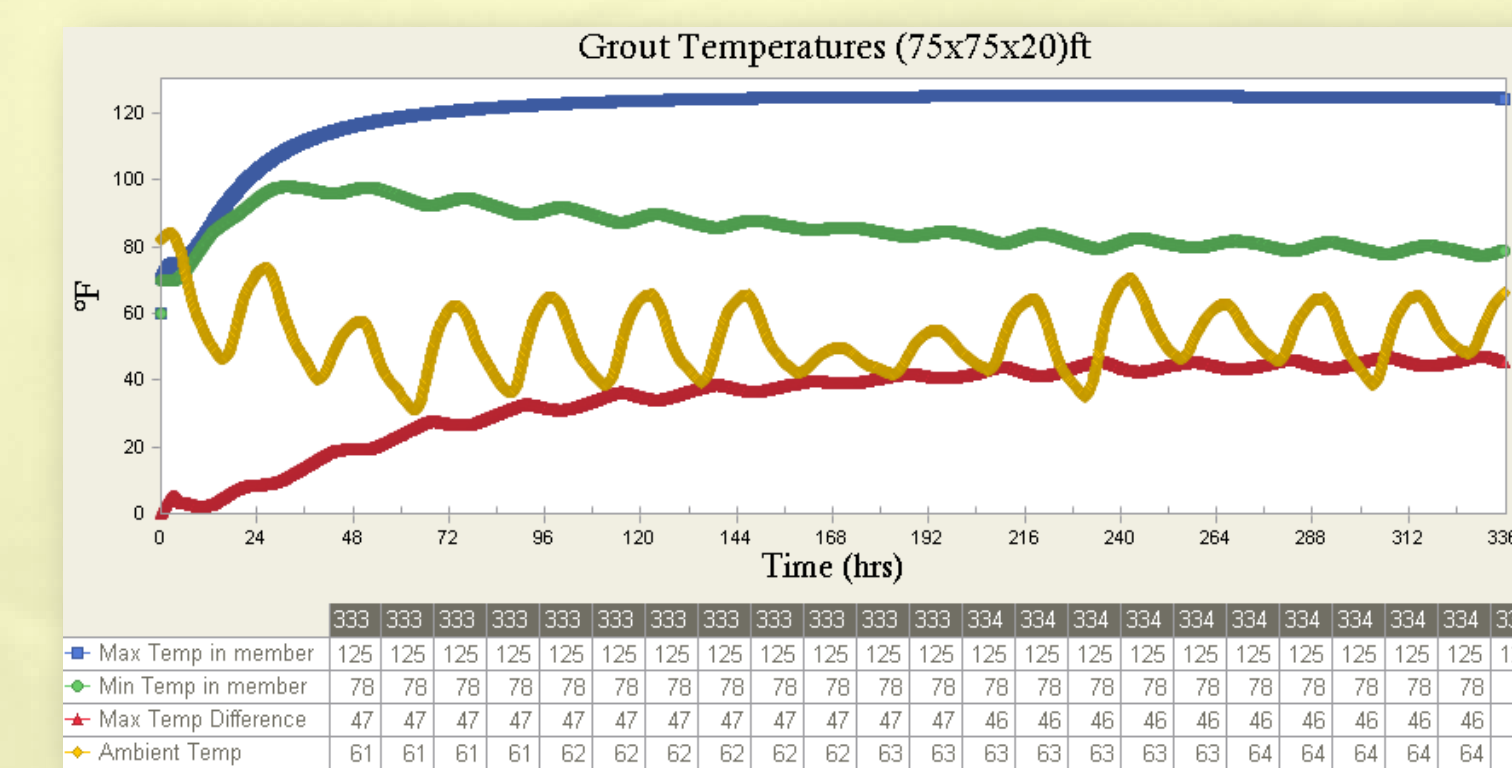
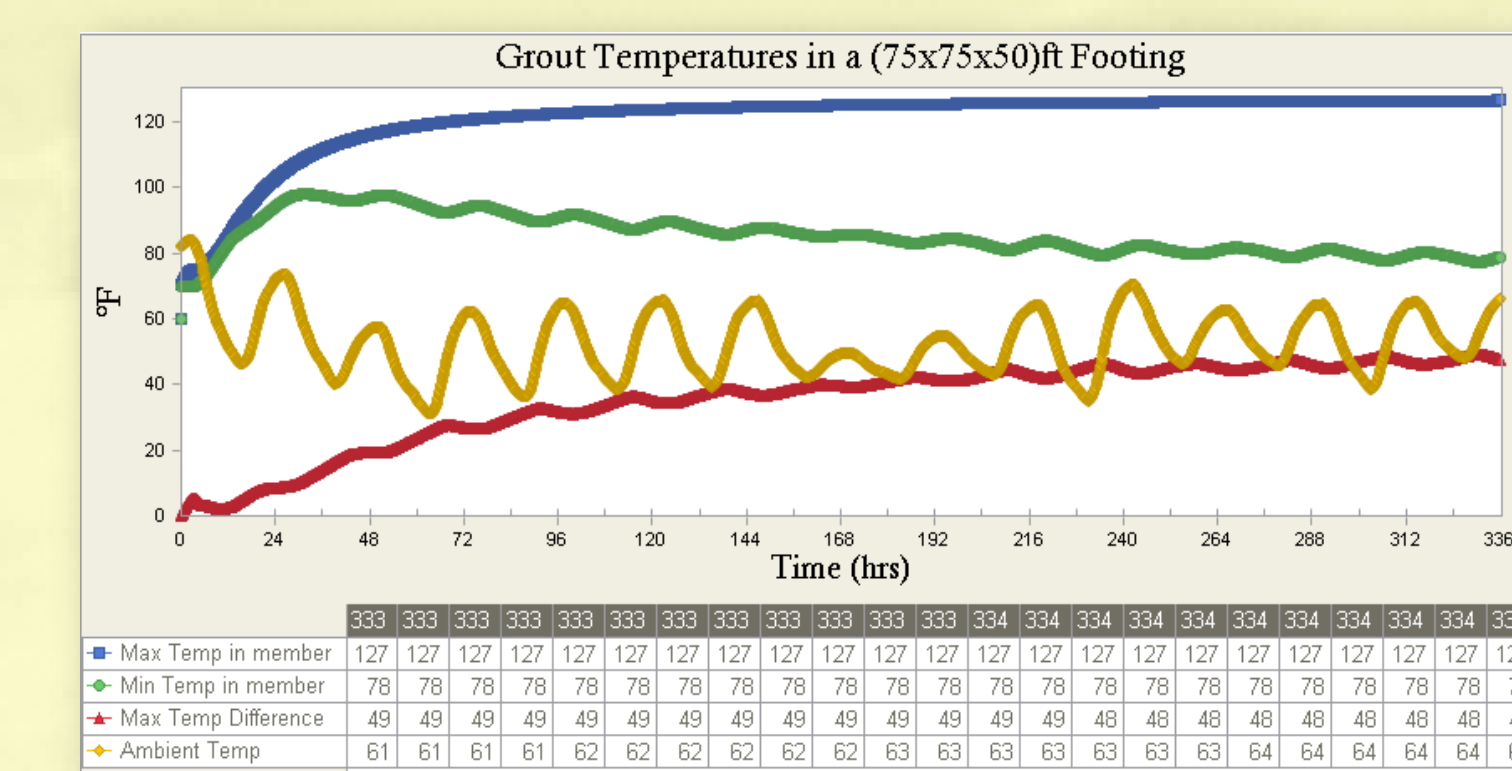
Data above demonstrates deviations between theoretical cross sections and experimental values.



CONCLUSION:

Based on evaluation, the rectangular footing best represented the tank closure situation, and the maximum temperatures predicted were less than 130 °F. Due to the small amount of cement contained in the grout formulation designed for use during bulk filling of the tanks, elevated temperatures will typically not exceed levels of concern. Maximum temperature values plateauing, prove that grout lift height will not be a concern or limitation.

Results:



- Three models were processed to determine grout lift heights 50ft, 20ft and 15ft.
- Maximum temperatures did not exceed 130 °F.
- Only the 15ft model demonstrated a maximum temperature.
- The other two models kept same temperature for days.

Lift Height(ft)	Max Temp Recorded (°F)	Max Temp Difference (°F)
15	123	44
20	125	47
50	126	49

