1. INTRODUCTION

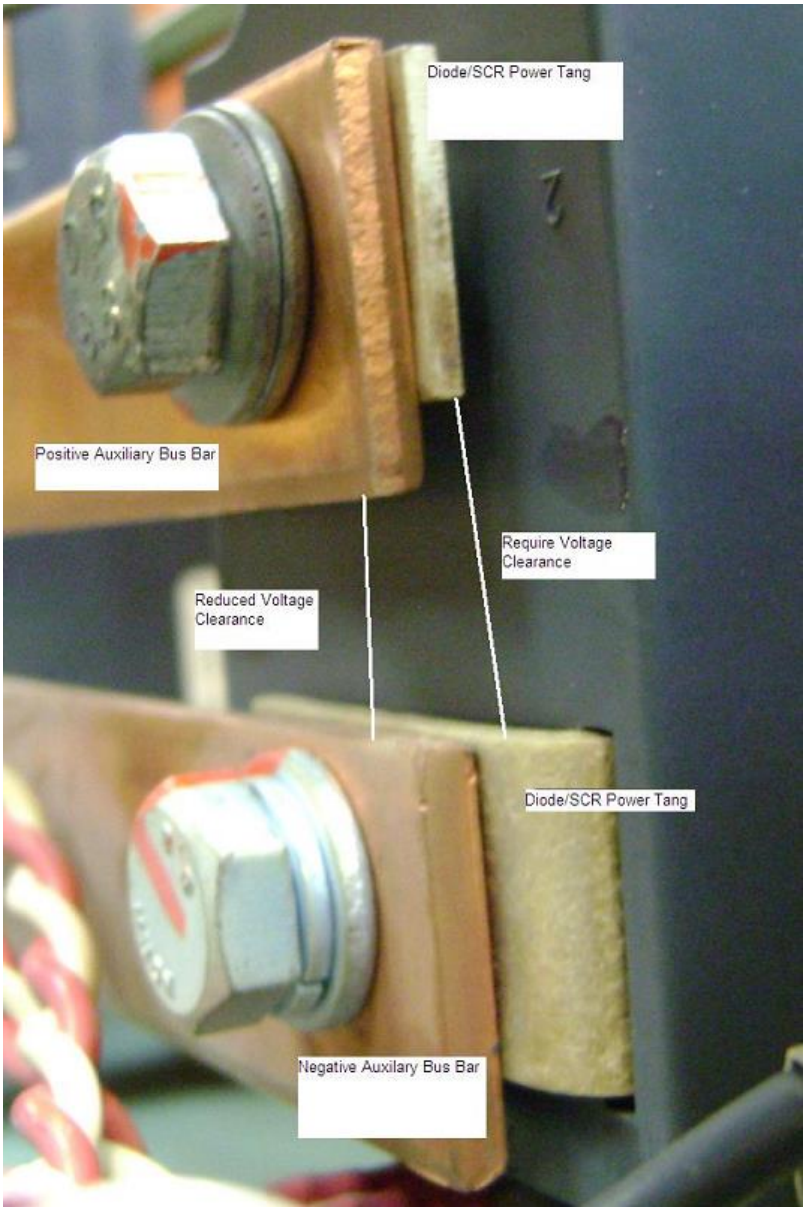
This document presents our findings with regards to the component failures from the 608 Hp Variable Speed Drive installed at 740 Progress Avenue in Scarborough, Ontario, Canada.

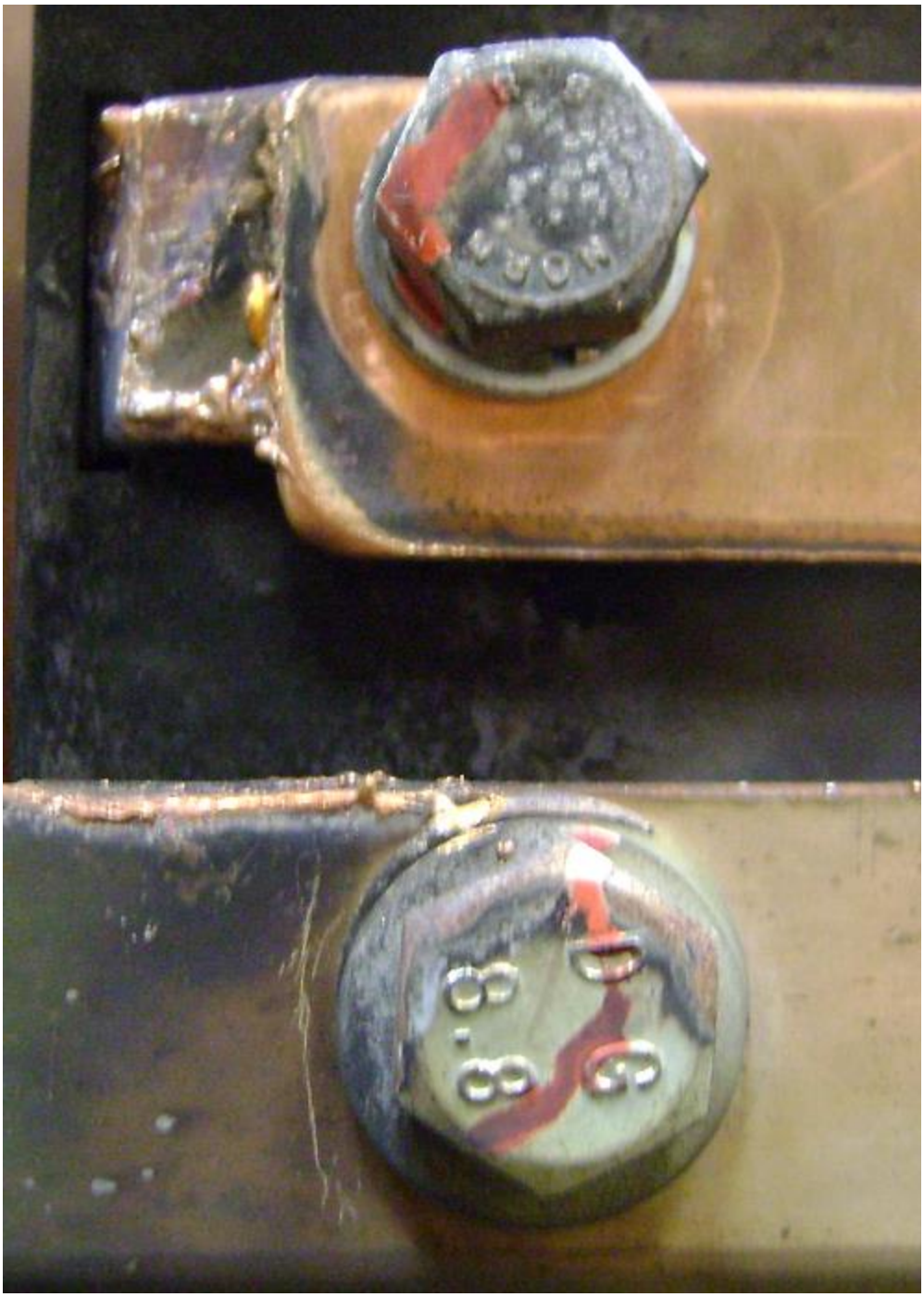
2. STARTER COMPONENT FAILURE

Shortly after testing the chiller through emergency power sequence, the starter experienced catastrophic failure of the Snubbers, IGBT and Trigger Board. The initial field inspection and report suggested incoming power transients initiated the failure. While this remains the most likely cause of the component failures, factory inspection of the failed components was conducted to investigate other potential causes.

3. FACTORY ANALYSIS

As part of the factory analysis, the engineering team investigated the manner in which the components were assembled for proper procedure and tolerances. The returned components were found to have the positive auxiliary bus bar on the diode/SCR module installed upside down. When installed in such a manner, the voltage clearances between the positive and negative bus bars are less than designed. In general, bus bars should never be any closer together than the space provided by the device they are connected too. Below attached are the pictures #1 and #2 noting this fault:

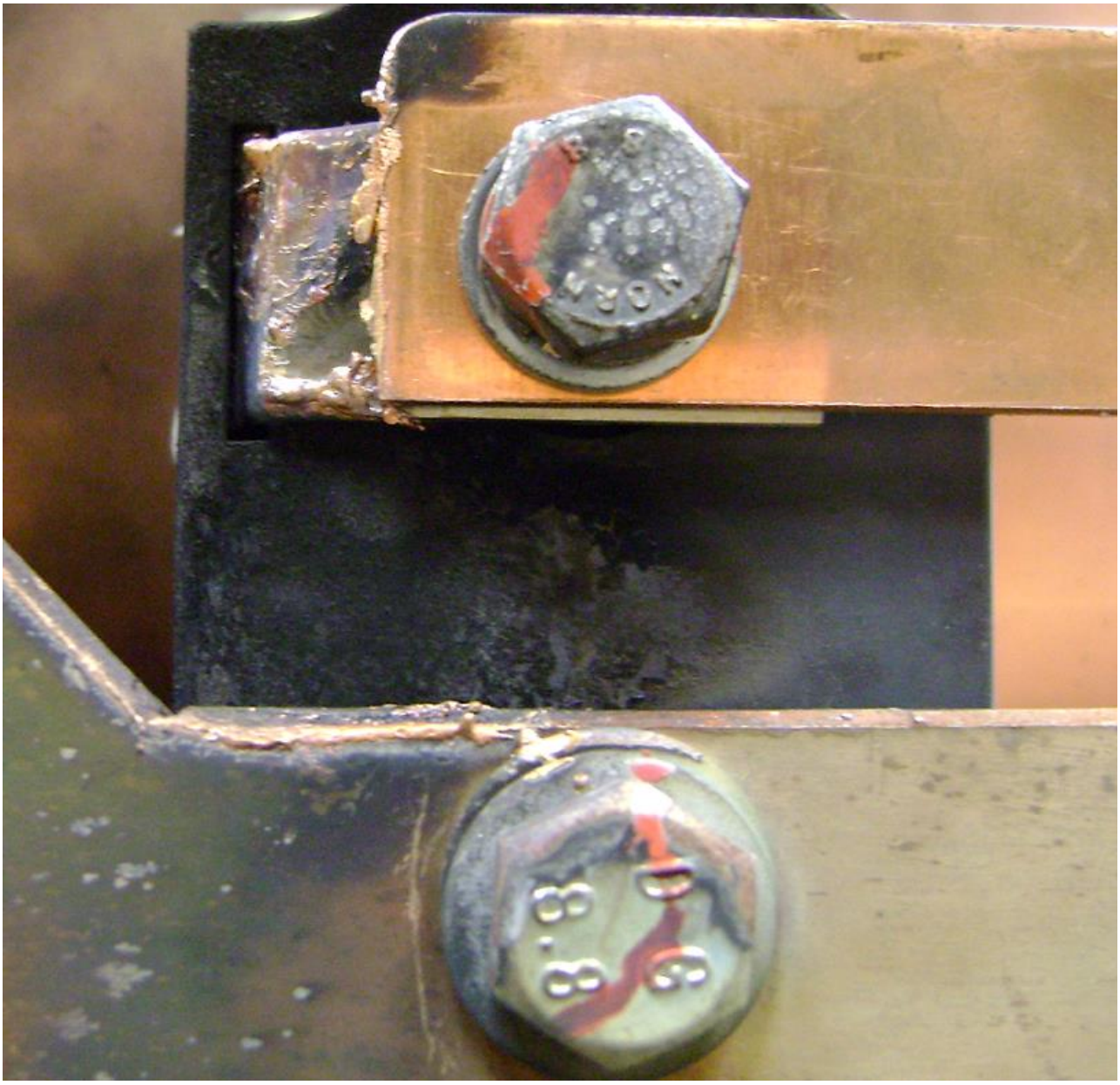

Diode/SCR Power Tang
Positive Auxiliary Bus Bar
Require Voltage Clearance
Reduced Voltage Clearance
Diode/SCR Power Tang
Negative Auxilary Bus Bar

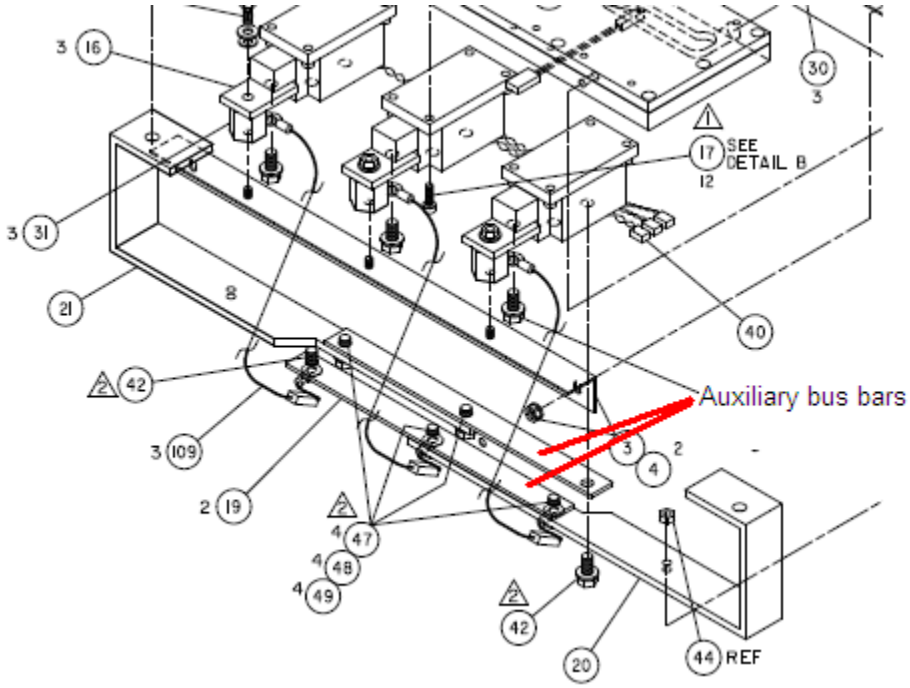


Picture #2.

4. MANUFACTURING CLARIFICATION

Supplementary assembly instruction and demonstration provided to emphasize the importance of proper assembly of this component. Attached below is an example of proper assembly in picture #3 and in the diagram of picture #4 :





Picture #4

5. CONCLUSION

In summary, and although not conclusive, our findings indicate the manner in which the drive components were assemble were incorrect and could have contributed to the failure of the VSD drive. The newly ordered components that we plan on installing into Chiller #1 at 740 Progress have been individually inspected by our factory representative to ensure proper assembly of the components.