

Condition Assessment of Used Electronics – Caterpillar, Inc., Rochester Institute of Technology, CoreCentric

Node Alignment: Remanufacturing & End-of-Life Reuse

Project Type: Full

- Current industry remanufacturing practices rely primarily on functional testing, which detects most printed board failures. Solder joint degradation is often not detected by functional testing. Solder joints and interconnects amount to about 13% of all electronics failures, and they can fail in different ways.
- Detecting and locating solder joint and interconnection failures on used PCBs presents a serious challenge to remanufacturers, with considerable cost associated with manual inspection and testing. The inspection methods vary in their ability to detect incipient failures of different types and vary in their applicability to different PCB types. They also vary in cost, speed of detection, and their suitability for remanufacturing factory floor. In practice, this leads to a lack of remanufacturing in certain high reliability applications, or warranty returns in applications where remanufacturing is used.
- The cost of inspection and testing is also a barrier to remanufacturing for some part numbers, therefore increased automation of existing processes, as well as any new processes, is important in order to improve PCB reuse rate across the remanufacturing industry.
- REMADE Technical Performance Metrics (TPMs) Being Addressed:
 - Achieve cost parity for secondary materials processing in e-waste materials.
 - Reducing primary feedstock consumption and increase secondary by 30%.
 - Improving embodied energy efficiency by 25% within 5 years.
- Technology/Knowledge Gaps Being Addressed:
 - In practice, while used circuit boards are functionally tested for condition assessment, there are no technologies available to measure or detect latent defects in used printed circuit boards.