HMW VSD Workshop

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Recent Additions:
- West Allis – PSD Service Center (ex-Regenco)
- Philadelphia – PV Business Operation
- Austin – R&D Center for Power Electronics

Recent Additions:
- Edmonton – Service Office for Motors & Drives
- Dallas – R&D Center for Currency Sorter
- Hamilton: TIPCA – Motor Operation

Oil & Gas
- Drilling & Pumping
- Production
- Pipeline

Mining
- Pumping
- Transportation
- Retining

Utilities
- Power Transmission
- Power Distribution
- Energy Management

Agribusiness
- Raw Materials
- Extraction
- Food Processing

Water & Wastewater
- Processing
- Treatment
- Wastewater Re-Use

Datacenters
- Data Storage
- Colocation
- Infrastructure

Medical
- Power Solutions
- Facilities
- Control Systems

Aggregate & Cement
- Extraction
- Crushing
- Handling

Food & Beverage Pharmaceutical
- Packaging
- Handling
- Daily Pressure Washes

Pulp & Paper
- Wood Processing
- Pulping
- Production
"It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change." - Charles Darwin
MADE IN HOUSTON TEXAS

MADE IN USA

TOSHIBA
Leading Innovation
• **MVD Penetration**  
  – Going up in last 15 years, especially last five years  
  – Strong demand from oil & gas, mining

• **Challenging Specification**  
  – Higher input voltage  
  – Higher Power  
  – Highly customized design  
    • Footprint, frame, cooling …except for power module
Impact of SiC on High Power VSD

• **Impact is revolutionary**
  – Waiting for reliable power module with higher blocking voltage and higher power
  – Need redesign the whole power converter
    • Reconsider topology and snubber circuit
    • Redesign power module and module level control
  – Educate design engineers, quality control team, industrial engineers, manufacturing workforce….
  – The cycle is VERY long
"Know what's weird? Day by day, nothing seems to change, but pretty soon...everything's different." - Calvin from Calvin and Hobbes

Thank You