Systems approach to OBVP
Requirements
Systems approach to OBVP requirements

Topics

- Kollmorgen Background
- TARDEC FED Program
- OBVP Power requirements
- Example “working the HUMPBACK curve”
Kollmorgen

Custom Motors & Actuators

Motors & Drives

Generators & Power Electronics

Vehicle Automation Solutions

Traction Machines
Disruptive Innovation – for OBVP

**The Need**

- Military vehicles need more on-board 28VDC electrical power – up to 30kW
- The needs exceed capabilities of existing low voltage alternators
- High Voltage systems (300VDC to 600VDC) are expensive, require significant package space, are heavy, and have safety concerns

**The Kollmorgen Solution**

Generates 30kW at the voltage the military needs 28VDC

Platform approach that is Modular/flexible

Saves weight, space, cost and operates at safe voltage

Leverages adjacent KM market technology (lift truck) electronics and KM expertise in motor design

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**Mine Resistant Protected Vehicles (MRAP)**

**Combat vehicles**

**Tactical Vehicles**

More Electrical power needed for:

- Communications systems
- Computers
- Mine protection systems
- Threat detection
- Weapon stations

- **Game Changer for OBVP**
  - High power (30kW) at low voltage (28VDC)
  - Modularity: 20-60kW systems
  - Belted, PTO, In-line generators with common power electronics/controller

KM provides a solution that uniquely and efficiently meets a need
TARDEC Fuel Efficiency Demonstrator (FED) Program

- Kollmorgen Generator and Generator Controller
- 150 lb weight savings
- 30kW 28 volt ISG
Kollmorgen Low Voltage Platform - Flexible for multiple Vehicle Platforms

One common controller architecture

- 20 kW belted
- 30 kW ISG
- 30 kW belted
- 50 kW ISG

28VDC
Systems approach to OBVP requirements

Topics

- Example “working the HUMPBACK curve”
Vehicle Electrical Power

Initial Question – I need more OBVP……..

What Power is requested?

What Engine Speed Range?

What Voltage (28VDC, 300VDC, 600VDC, Multiple voltages)?

What type of Generator/Motor (IG, Belt driven, PTO, water/air cooled,....)?
What Power is requested, speed, Voltage, type?

Initial answer 30kW, 28VDC, at all speed ranges, Water Cooled ISG
Vehicle Electrical Power

What Power is requested, speed, Voltage, type?

Initial answer 30kW, 28VDC, at all speed ranges, ISG Water cooled.

Next Questions
- Can the engine deliver at the low speeds?
- Where does the engine operate?
- Where are the shift points?
- Continuous or peak demands?
- Where do you want peak efficiency?
Vehicle Electrical Power

What Power is requested – 30kW

Get rid of the baggage – extra weight, extra cost, extra space

Cover with “peak”

Continuous line

Power (kW)

Engine Speed (RPM)

Maximum normal operation speed point (D)

Minimum operation speed point (A)

Minimum speed (E)

Lowest maximum power operation speed point (B)

Maximum normal operation speed point (C)
Result – an “optimized” humpback curve
Systems approach to OBVP requirements

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Take Aways
• Systems approach – generate the power at the voltage the consumer needs – 28VDC may be the most efficient approach (less than 50kW)
• OBVP Requirement – more than just a stated kW – multiple points
Thank you -

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