Truck Hydraulics
Fan Drive Systems Training
Basic Overview
Hydraulic Fandrive System
Successes and Potentials.

Fan Drive Solutions
Fuel burning engines produce enormous amounts of heat.

Temperatures can reach up to 4,000 degrees during combustion

Normal operating combustion temperature is about 2,000 degrees F.

As fuel is burned in the engine –

1/3 Approx one-third of the energy in the fuel is converted into power.

2/3 Another third goes out the exhaust pipe unused!

3/3 The remaining third becomes heat energy.

This last third is the portion we are concerned with!
Effects of cooling

If a part of the engine gets too hot –

• The oil film breaks down and fails to protect internal parts.
• Parts get hotter leading to tighter operation = reduced HP & more fuel used.
• Fuel ‘detonation’ can occur = damage to pistons & Valves.

If an engine runs at too low a temperature-

• It is inefficient giving low horse power.
• The oil gets dirty (adding wear and subtracting horsepower).
• Deposits form, and fuel mileage is poor-- not to mention exhaust emissions!
Parasitic Power = Wasted Power....

- Direct drive fans cost money and efficiency !!
- Power absorbed by ‘Rotating’ fans is high and proportional to the cube of the speed!
- Max. cooling needed as low as 5% of operating time.
- Direct drive fans use this ALL the time, needed or not!

Typical Values:
- 0.12HP (90W) @ 500 RPM.
- 15HP (11kW) @ 2500 RPM.
- 27HP (20kW) @ 3000 RPM.
• Hydraulic system oil.
• Automatic Transmission fluid.
• Engine oil.
• Air conditioner refrigerant.
• Engine Charge air.
• Engine water jacket.
• ‘External Attachment’ fluids.
• Diesel Fuel.
• Others.
Where is Hydraulic Fan Cooling used now?
The **ONLY** manufacturer with....

**ALL the parts !**

- Hydraulic Motors.
- Hydraulic Pumps.
- Manifolds.
- Valves & Cartridges.
- Filters, Hoses & Fittings.
- Design Engineering & Application Expertise.
Parker - Divisional Support...

- Gear Pump Division (GPD)
- Vane Pump Division (VPDE)
- Piston Pump / Motor division (HPD)
- Integrated hydraulics division (IHD)
- Hydraulic Valve Division (HVD)
- Chelsea PTO
- Filter Division
• 50 ton truck.
• ‘Payhauler’ / Terex
• Retro-fit program

Hydraulic Fan Data
- Mud Shift
  - 2
  - 6:00am to 3:00pm
  - 2/25/03
  - 2/26/03
  - 91
  - 9:42
  - 17.5
  - 167
  - 9.54
  - 1.84

Engine Fan Data
- Mud Shift
  - 2
  - 6:00am to 3:00pm
  - 2/27/03
  - 6:00am to 12:00pm
  - 2/28/03
  - 71
  - 10:06
  - 14.7
  - 164
  - 11.16
  - 2.31

Hydraulic Fan Drive – Fuel Savings.

- Fuel Savings Percentage - 14.5 %
- Total Gallons Saved - 22.72 Gal / Day
- Amount Saved at $2.50 a gallon - $56.80 / Day
Engineered Solutions
Innovation = cost saving !
Innovation = cost saving!

Parker 12AS Spin-on Filter

- Flows to 15 gpm
- Operating pressure 1,000 psi
- 10µ Microglass media
- 25 psi integral bypass
- Bowl: .061 cold roll steel
- Patented no-leak, integral bypass w/ each element ensures reliability
Fan Drive Controllers
Stand alone version – WITH reverse feature

- Controls **Fan drive only**.
- Digital operation and accuracy
- Programmable through user GUI.
- Bi-directional drive (Purge/de-ice).
- 3 x sensor inputs (Discrete).
- Coded Alarm LED and output.
- Data Logging (when connected to PC).
- LED Diagnostics.
- Full CE approval.
- Retro-fit and OEM usage
- Targeted at Off-Road applications
Stand alone version – NO reverse

- Controls **fan drive only**.
- Digital operation and accuracy.
- Programmable through user GUI.
- Uni-direction drive.
- 2 x Override inputs (fan full on).
- 3 x Sensor input (Discrete).
- Coded Alarm indicator.
- Data Logging (when connected to PC).
- LED Diagnostics.
- Retro-fit and OEM usage.
- Targeted at On-Road applications

DFC-2
Bulkhead mounted - ECM version II

- Controls fan drive only.
- Analogue driver.
- Bulkhead mount design.
- 10-32V supply (one unit for all voltages)
- Uni-Direction drive.
- Direct ECU connection.
- Operation dependent on ECU output.
- Very simple connections and settings.
- Deutsch connectors to match IHD coils.
- Full CE approval
- Designed for new hotter environments.

NOTE:
DFC-4 to replace DFC-3
ALL new applications
Fan SYSTEM controller - J1939 interface.

- Programmed for fan systems only.
- Digital operation.
- J1939 (CAN) interface.
- 85 Degrees C operation
- 10-32V supply (one unit for all voltages)
- Multi-proportional drive outputs.
- Multi-On/Off drive outputs
- Multi analogue/digital inputs.
- Allows HP sharing (fan & Steering)
- Deutsch heavy duty connector set.
- LED diagnostics.
- Full CE approval
Wide Systems integration – TOC 8 & MDL.

IQAN – TOC 8 & MDL

- FULL system integration applications.
- More than fan system control possible.
- Programmed to suit application.
- Integrated display / MMI.
- J1939 interface.
- Digital Operation
- 70 Degree C operation.
- 10-32V supply ( one unit for all voltages )
- Full CE approval
FLEXIBLE CORE HEAT EXCHANGERS

MESABI

Parker Mobile Hydraulics
Reichdrill

Sonntag-A.ppt
**Dual system Horse Power sharing and limiting Circuit:**

- Fan pressure
- Integrated priority valve
- Integrated prop. Pressure valve
- Integrated prop. Pressure valve
- To Steering
- Boost Bypass Valve
- Steering R/V
- Integrated priority valve
- Steering pressure
- Engine drive shaft
- P1
- P2
- M1
- M2
- Parker Patented concept

**Parker Patented concept**
Torque Control strategy – Real time (Patent applied for).
- We work with customer engineering to...
  - Specify & Design efficient custom cooling system
  - Analyze & Model proposed solution.
  - Test and validate prototype system.
  - Give system Training and implementation.
  - Provide complete system supply as required.

DATAQ, SOMAT, Campbell Scientific

Analysis Through Data Acquisition
Prototype Testing & Documentation

Test Lab:

- 4 Dynamometers
- 500 HP
- 250 HP
- 125 HP
- 70 HP

- 1 RPM Stand
- 9 Endurance Test Cells
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Thank You for your time.

Fan Drive Solutions