

Technology and Maintenance

Enno Jakobson

Challenger Motor Freight Inc.



Technology and Maintenance

- Technology and maintenance support fleet safety
- Helps reduce liability
- Helps reduce operating costs

Role of satellites

- Immediate accident reporting
- Speed exception reports
- Fuel consumption and fuel tax reporting
- Mileages for PM scheduling

Emergency macro

Message : From 2130: * EMERGENCY *****

TYPE OF EMERGENCY: (A)CCIDENT,

(H)I-JACK,(O)THER (A,H,O): A

INJURIES (Y/N): N

AMBULANCE (Y/N): N

HAZ MAT SPILL (Y/N): N

VEHICLE DRIVABLE (Y/N): Y

COMMENTS: OFF THE ROAD IN THE GRASS

Speed exception report

SensorTRACS VEHICLE PERFORMANCE (UNSUMMARIZED RECORDS)

Vehicle Id/Name..... 2891 TRUCK 2891
Driver Id/Name..... GREJO JOHN GREATHEAD
Start/End Dates..... 05/14/04 23:15 to 05/21/04 23:50
Average Speed..... 052 MPH Fuel Mileage..... 00009.13 MPG
Total Distance..... 0003305 Mi Driving Mileage..... 00009.29 MPG
Engine Time..... 000069:48 H:M
Driving Time..... 000063:22 H:M Intertrip Idle Time. 000006:19 H:M
Moving Time..... 000060:10 H:M Intertrip Idle Pct.. 009.04 %
Total Active Time... 000168:34 H:M Short Idle Time..... N/A H:M
Over RPM Time..... 000000:00 H:M Extended Idle Time.. N/A H:M
Over RPM Percent.... 000.00 % Extended Idle Pct... N/A %
Over Speed Time..... 000002:39 H:M Auto Fault Check.... DISABLED
Over Speed Percent.. 004.40 % Possible Faults..... 000004 #
Excess Speed Time... 000000:01 H:M Extraction Date..... 05/21/04 23:50
Coast Out of Gear... 000000:00 H:M User Fault Confirm.. NOT REVIEWED

Braking technologies

- ABS-anti-lock braking systems
 - Ability to prevent wheel lock up on all wheels
- ATC-automatic traction control
 - Ability to prevent wheel spin
- EBS-electronic braking systems
 - Quicker application of pressure to wheels
- Disc brakes
 - Less brake fade

Roll Stability Control

- Electronic sensing to help prevent vehicle roll-overs
- Controls lateral acceleration
- Automatically
 - reduces engine torque
 - Engages engine retarder
 - Applies drive axle brakes

Super Single Tires

- Improved lateral stability
- Improved fuel economy
- Increased load capacity

Super Single Tires



2004 5 28

Automatic Transmissions

- Improved fuel economy
- Reduced power train stress
- Improved driver comfort

Fleetsmart

■ Fuel conservation strategies

- Progressive shifting
- Road space management
- Idle reduction

Fleetsmart

- Liquefied natural gas engines
 - Alternative fuels pilot
 - Reduced greenhouse gas emissions
 - Lower operational cost per mile
- Load based speed control
 - Conserves fuel
 - Limits engine rpm's available to driver

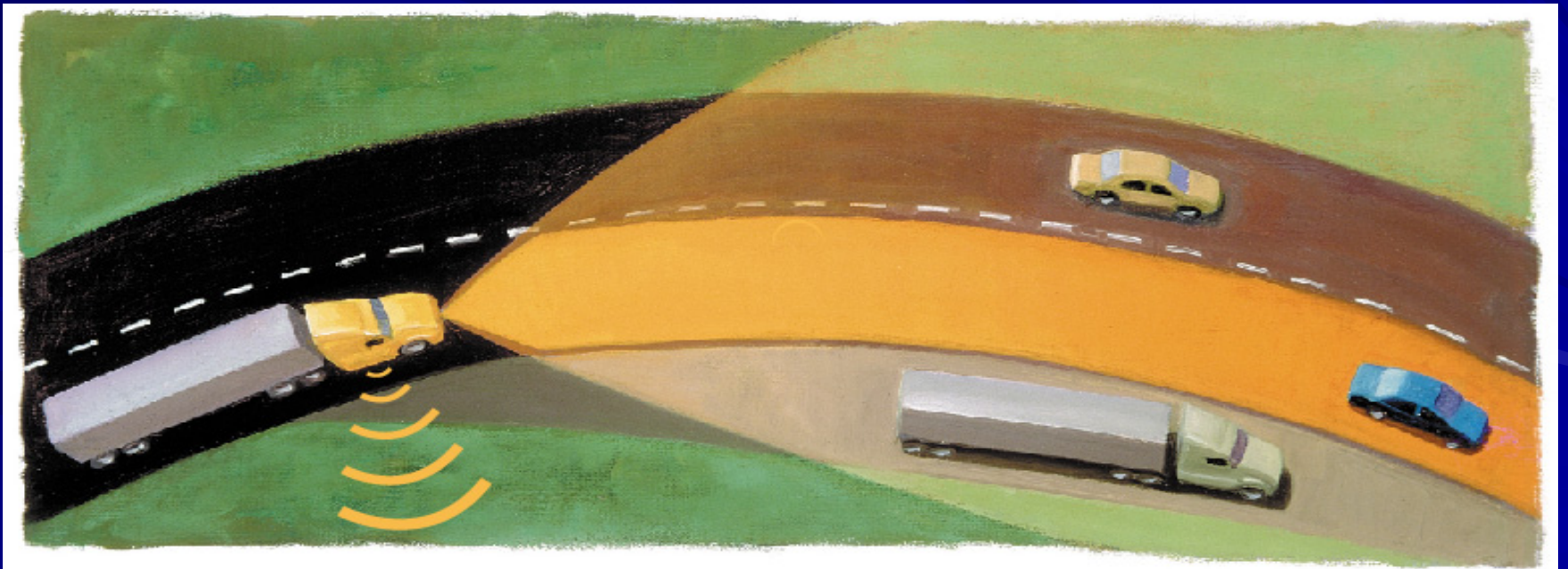
Night vision

- Improves driver vision at night
- Infra red beam detects different temperatures in objects



VORAD

- Radar beam detects objects near vehicle
- Warning system for driver



VORAD

Object detected within 350'

3 Second Following: Target within 3 seconds following distance; target opening/closing = no tones

2 Second Following: Target within 2 seconds following distance; target opening = no tone, target closing = tone

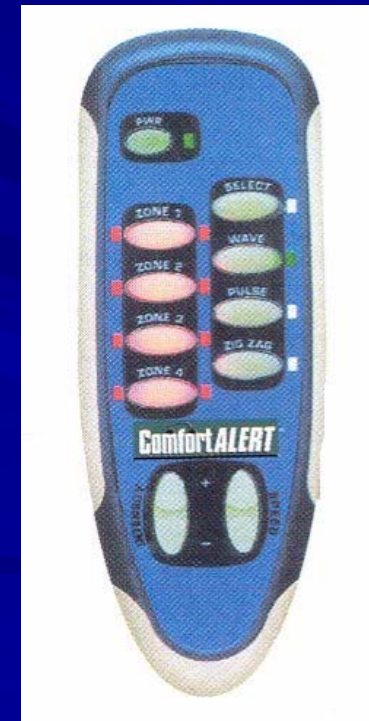
1 Second Following: Target within 1 second following distance; target opening = no tone, target closing = tone

1/2 Second Following: Continuous tone closing or opening



Fatigue management

- Heated massaging units
- Reduces driver stress



Fatigue Management

- Sleep Watch
- Worn by driver
- Displays level of readiness for duty



Fatigue management

- PERCLOS monitor
- Measures eyelid droop
- Alerts driver should eyelids begin to close



Fatigue management

- Lane tracker
- Monitors vehicle lane position
- Alert should vehicle begin to wander



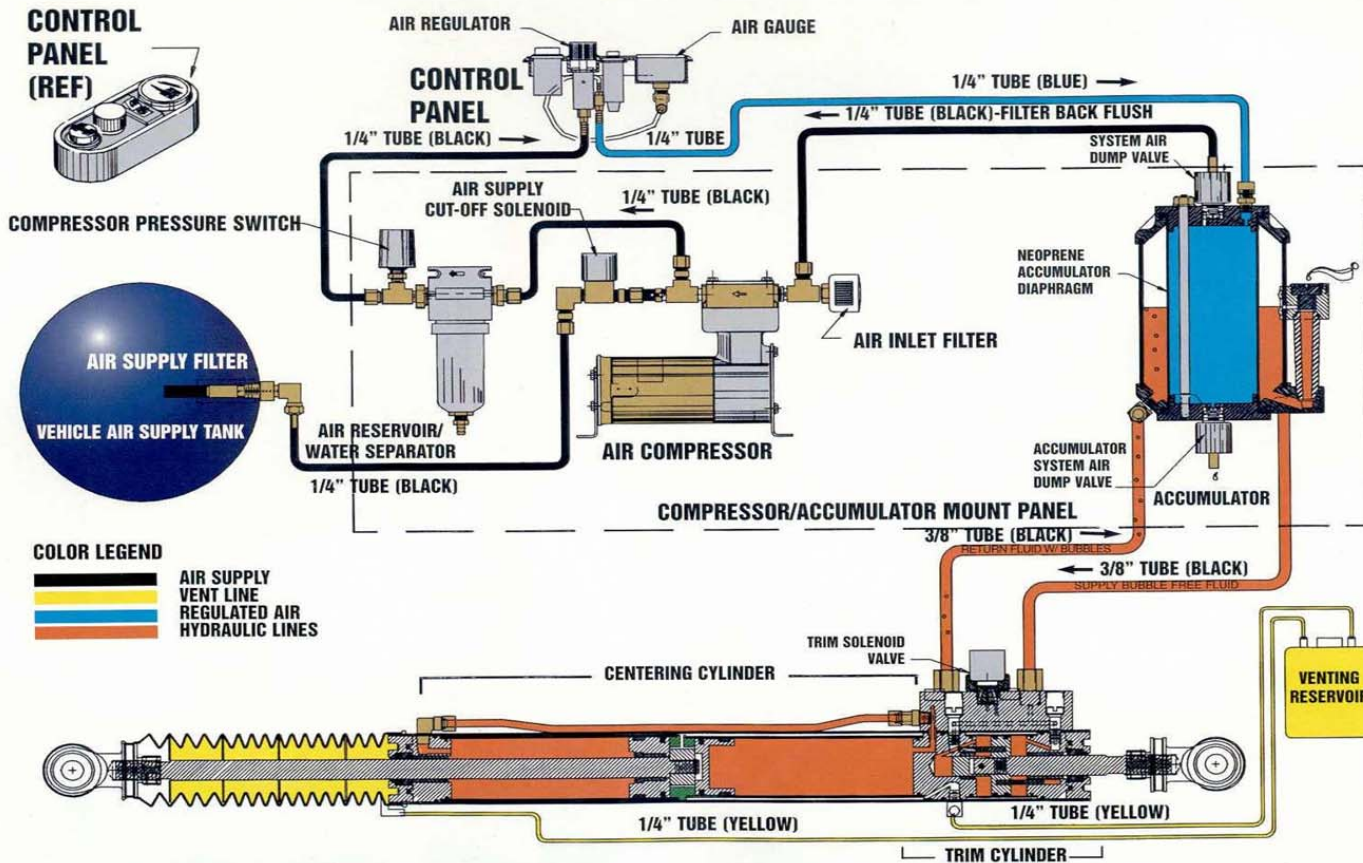
Fatigue management

- Howard center power steering system
- Reduces amount of steering wheel correction for the driver



Howard Center Power Steering System

HOWARD POWER CENTER STEERING SYSTEM using Vehicle Air Supply with Optional Electric Compressor
(Typical Hydraulic and Air Line Layout)



Howard Center Power Steering System



Technology and Maintenance

- Technology and maintenance support safe operations
- The operator of the vehicle still has the ability to control the final outcome