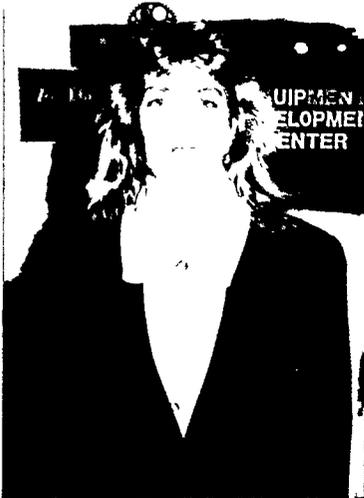


# Mechanical Engineering Support



**Kathleen Kreyns**  
Program Leader, ME Support

The Forest Service owns and operates approximately 17,000 vehicles located throughout the United States. This fleet ranges in size from sedans and pickup trucks to large fire engines and heavy equipment. Design and testing of various fleet components routinely require a wide range of specialized technical information and skills that can best be provided at a centralized national agency location.

Thus, the San Dimas Technology and Development Center (SDTDC) Mechanical Engineering (ME) Support Program was created in 1988 to fulfill fleet needs. Monies are provided to the ME Support Program based on the percentage of equipment in each Region's Working Capital Fund (WCF). The ME Support Program has responded to the changing needs of Forest Service equipment users via technology transfer to reduce cost, increase efficiency, and provide a safer working environment. The Program is managed by Kathleen Kreyns, Mechanical Engineer, SDTDC Program Leader for ME Support.

## Technical Services

### SE01T90

*Kathleen Kreyns is the Project Leader*

In response to the needs of Forest Service users, this project has shifted emphasis from procurement support and a technical library to primarily technical support for Forest, Regional, and Washington Office (WO) Equipment Engineers. This technical support is provided to solve *ad hoc* equipment problems and to respond to requests for quick turnaround, limited-scale, preliminary studies or evaluations. This includes both troubleshooting on individual field problems and administrative studies of suggestions and proposals. It also includes (as required) participation in meetings, conferences, and workshops, as well as coordinating the ME Support Program at the San Dimas Center and providing a source of technical information for Forest Service Equipment Engineering.

At the request of Regional and WO Equipment Engineers, SDTDC investigates, analyzes, and recommends solutions to equipment problems, questions, and suggestions. This can include the development and monitoring of a Technology Transfer Agreement between a private manufacturer and the Forest Service. SDTDC maintains close working relationships with other agencies, academia, and private industry.

Recent issues brought to SDTDC have included deer whistles, door decals, gross combined weight ratings (GCWR), vehicle extended warranties, and limited-slip differential devices. A major focus of SDTDC attention has also been alternative fuels. SDTDC has not only monitored new technology in this field, but has begun the process of acquiring or modifying alternative-fueled vehicles for its own fleet. This exposure will allow SDTDC to pass on hands-on experiences to the field. A list of publications written as a result of all these investigations is at the back of this report.

## Design/Drafting

### SE01T92

*Fred Cammack and Dan McKenzie are the Project Leaders*

The Forest Service purchases fire engines that have been tailored to meet various local conditions and needs. These fire engines are built utilizing standard cab and chassis vehicles in conjunction with custom-designed bodies.



*Dan McKenzie, Project Leader*

SDTDC keeps the fire engine technical data packages and designs, which are utilized for procurement, up-to-date as directed by the Regions. This involves incorporating changes in technology and advancements, correcting for obsolescence and omissions, and accommodating component and vehicular modifications and safety regulations. Design/drafting assistance is

the current critical need, with specification assistance provided as required.

SDTDC provides these design, drafting, and specification services to Regional and WO Equipment Engineers. The Center reviews and updates drawing packages including those recently finalized or with major recent revisions by the



*Fred Cammack, Project Leader*

Regions. As required, this information is then provided for Service-wide and Regional designs.

In 1991, SDTDC began utilizing computer aided design and drafting (CADD) for drafting of all fire engine packages. CADD allows the design/drafting of new engines, and revisions to existing engines, to be more efficient, more accurate, and less costly. SDTDC maintains its CADD expertise with state-of-the-art software, hardware, and training.

Projects are scheduled at the beginning of the year with Regions and coordination continues throughout the year. A three-phase (proposal, design, drafting) process is utilized to accomplish design/drafting work on fire engines. SDTDC is proud to have completed over 12 fire engine design packages in the last 3 years for the Southwestern, Intermountain, Pacific Southwest, and Pacific Northwest Regions. (R-3, R-4, R-5, and R-6).



*The Forest Service Wildland Fire Engine Design Team reviewing a recent production engine.*

*(left to right)  
Manuel Damole, Mechanical Engineering Technician,  
Dan McKenzie, and Rick Waite, Engine Captain, Lower San Antonio Station, Angeles NF.*

## Electronic Use Recorder

1E11L01

### *Skip Garrett is the Project Leader*

Inventory, management, and cost data for the over 17,000 vehicles in the Forest Service fleet are being manually collected, maintained, and entered into computers at the National Finance Center (NFC) in New Orleans, LA. These data are required to meet Section 10 goals of the Federal Energy Management Executive Order 12759, which mandates both a 10 percent reduction of fuel consumption by 1995 and the periodic reporting of specific vehicle use and fuel data to the U.S. Department of Energy. Because of the excessive efforts required for the manual collection and input of data, the accuracy and completeness of data is questionable.

Under this project, SDTDC surveyed existing technology and manufacturers' products and developed performance specifications to meet Forest Service needs. These specifications included an electronic method (hardware and software) of collecting, storing, maintaining, and transferring—with the least amount of manual effort possible—Equipment Management Information System (EMIS) and WCF data required for management and upward reporting. Through the use of modern electronic technology (such as microchips containing vehicle users' names and project accounting codes), the required management and accounting data are collected and placed into a personal computer (PC).



*Skip Garrett, Project Leader*

The Forest Service will write the software to download the data from the PC's to its Data General (DG) main frames. These data will then be transferred to the EMIS and the Central Accounting System (CAS) at NFC, thereby eliminating the manual and labor intensive methods currently employed.

These specifications were included in a solicitation that resulted in a contract award to Execulog, Inc. Phase 1 prototypes have been installed in a SDTDC and an Angeles National Forest, CA pickup truck.

Field hardware and software testing will continue through the end of FY 1993. SDTDC will then publish a test report with recommendations on what to purchase as advanced prototypes for a Phase 2 effort.

Concurrently, SDTDC has signed a Technology Transfer Agreement with Silent Witness of North America to install and test their electronic use recorder on a SDTDC sedan at no cost to the Forest Service. This parallel testing effort will provide even more data to allow SDTDC to make the best recommendation.

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**Publications  
Distributed to Regional  
Fleet Managers**

*R-5 Crew Carrier Corrosion  
Problem—Kreyns/McKenzie  
August 1992*

*Decal Performance  
Specification—Kreyns  
April 1993*

**Special Reports**

*Ford Van and Truck Brakes—  
Kreyns  
September 1992*

*Limited-Slip Differential  
Devices—Doan/Kreyns  
FY 1993 [To Be Distributed]*

*Effects of Alcohol-Blended  
Fuels on Small Engines—Kreyns  
September 1991*

*Decals for Vehicle Exteriors—  
Kreyns  
October 1992*

*Motor Grader Extended  
Warranties—Perez/Kreyns  
FY 1993 [To Be Distributed]*

*Deer Whistles—Kreyns  
October 1991*

*Alternative Fuels—Lu  
November 1992*

**Test Reports**

*Vehicle Efficiency Testing  
Organizations—Kreyns  
October 1991*

*Compressed Natural Gas—  
Kreyns  
November 1992*

*Execulog Electronic Use  
Recorder—Garrett  
FY 1993 [To Be Distributed]*

*Light Truck Manufacturers'  
Methodologies to Determine  
GCWR —Kreyns  
October 1991*

*Alternative Fuels Update—  
Lu/Kreyns  
February 1993*

<b>Current SDTDC Projects</b>		<b>Project Leaders</b>
SE01T90	Equipment Engineering Technical Services	Kathleen Kreyns
SE01T92	Equipment Engineering Design/Drafting	Fred Cammack Dan McKenzie
1E11L01	Electronic Use Recorder	Skip Garrett

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