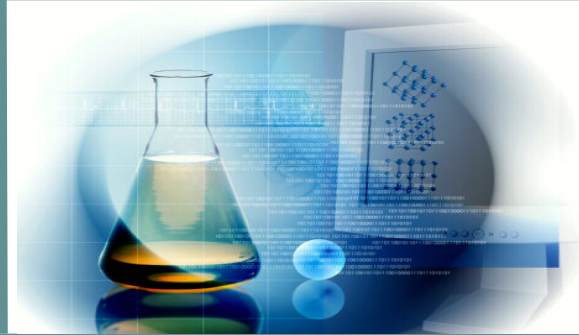


Petroleum Quality Assurance System (PQAS)

Innovative Software for Streamlined Petroleum Testing



Organize a testing mission

Input data directly from test equipment or manually

Reconfigure onsite to accommodate problems and changes

Produce reports easily

Keep an audit trail of all activities

In a testing lab, the right software can more than pay for itself by streamlining the testing operation, reducing error rates, and decreasing training costs. A package produced by Knowledge Road staff for the US Army's Product Manager, Petroleum and Water Systems (PM PAWS) illustrates this.

The Petroleum Quality Assurance System (PQAS), was designed as a result of a requirement from PM PAWS for a mobile testing lab that could be used in the field. The lab's supervisors would have to cope with a combat environment, high work flow, multiple types of testing equipment (some of which could report test results electronically), occasional instrument failures, lack of accessible repair facilities, multiple testing protocols, technicians who rotated in and out of the unit, and the knowledge that errors could result in physical injury to soldiers. (In Afghanistan, fuel quality was the cause of 78% of vehicle failures in the field.)

Because the program designer began by studying the needs of the PQAS lab operation, Knowledge Road has produced a package that minimizes many of the problems and takes advantage of the reporting capabilities of the individual test instruments. The software runs on a hardened laptop computer and serves as the control center for the lab. It handles workflow efficiently, guides technicians through their tasks, collects data directly from the testing equipment whenever possible, and decreases opportunities for error. Yet because of the mission to operate in less-than-optimum circumstances, it is also flexible - giving on-site lab supervisors the ability to reconfigure the system and modify testing parameters.

The resulting software is much more than a data-acquisition program, it is an integral part of the lab.

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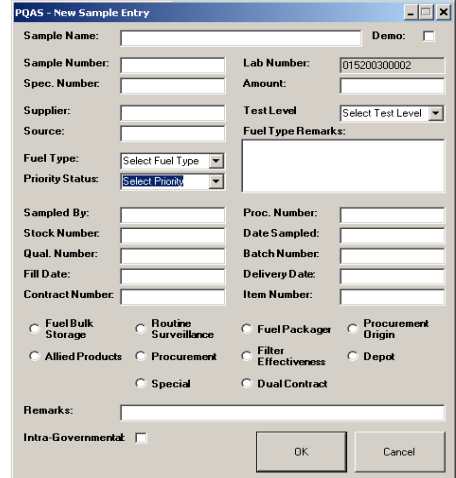
Solutions that bridge people and products



Need

It can be difficult to maintain productivity in a crowded testing lab with a wide variety of equipment types, high work flow, frequent hardware malfunctions, insufficient repair facilities and a high turnover in technicians. This was the situation faced by Army engineers trying to implement a Petroleum Quality Assurance System that could be used in the field to test vehicle fuels. They produced mobile labs containing all the needed test equipment, and purchased laptop computers to coordinate the effort. It was up to the software architects of Knowledge Road to design software capable of supporting high productivity and addressing the problems posed by this demanding situation.

Sample Entry Form

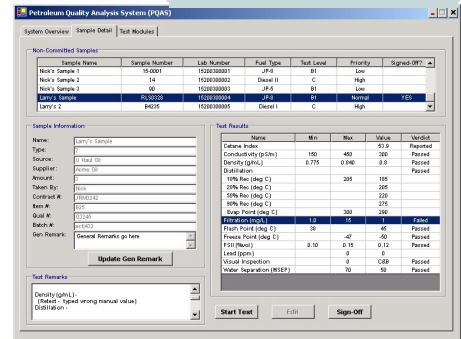


Solutions that bridge people and products

Solution

Knowledge Road staff designed a software package that serves as a control center for the testing process. When a test sample arrives, it is logged into the system and stays active until all tests are complete. Test data is usually collected in digital format directly from the test equipment, but can be input in manual mode if the equipment does not communicate results or in case of equipment failure. Tests used with each type of fuel are identified, and the operator who logs in the sample is presented only with the choices appropriate for that sample. Acceptable values can be defined for each type of sample - in which case the program will flag a sample that fails and will suggest another potential use for the fuel.

Test Results



Sample Name	Sample Number	Lab Number	Fuel Type	Test Level	Priority	Signed Off
He's Sample 1	15401	102000001	2#6	01	Low	
He's Sample 2	14	102000002	Dual II	C	High	
He's Sample 3	80	102000003	2#6	01	Low	
Empty Sample	80000	102000004	2#6	01	Normal	YES
EMPTY		102000005	Empty	C	High	

Param	Name	Min	Max	Unit	Verdict
Cetane Index	Cetane Index	150	463	0.0	Passed
Conductivity (pS/m)	Conductivity (pS/m)	0.775	0.040	0.0	Passed
Density (g/m ³)	Density (g/m ³)				Passed
Distillation	10% Rec (deg C)		205	105	
	20% Rec (deg C)			185	
	50% Rec (deg C)			235	
	90% Rec (deg C)			275	
	Endg Point (deg C)			335	
Flash Point (deg C)	Flash Point (deg C)	38	42	46	Passed
Freeze Point (deg C)	Freeze Point (deg C)	0.10	0.15	0.12	Passed
FSI (Phen)	FSI (Phen)	0	0	0	Passed
Visual Inspection	Visual Inspection	0	0	0	Passed
Water Separation (H2O%)	Water Separation (H2O%)	10	10	10	Passed

When testing is complete a report can be printed for the sample, and all related data is saved to a database for further analysis, report generation or to be radio-transmitted to a centralized data repository. The system provides a complete audit trail of all the testing activity.

Benefit

Productivity is improved as the software manages the workflow and allows different samples to make their way through the proper tests at the same time, without generating any of the confusion that might contribute to a higher error rate. Changes in tests used or in acceptable measurements are easily accommodated by a program module that allows the on-site lab supervisor to input new values. In the event of equipment failure PQAS enables the user the ability to manually input data, by the presence of "notepads" for free-response entries on each control screen and by the ability to reconfigure the system in the field. Technician training is simplified because of the extra guidance provided by the software.

Software Architecture

