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ARMY AVIATION TEST BOARD FORT RUCKER ALA  
EVALUATION OF CONSOLIDATED DIESEL ELECTRIC CORPORATION OIL SERV--ETC(U)  
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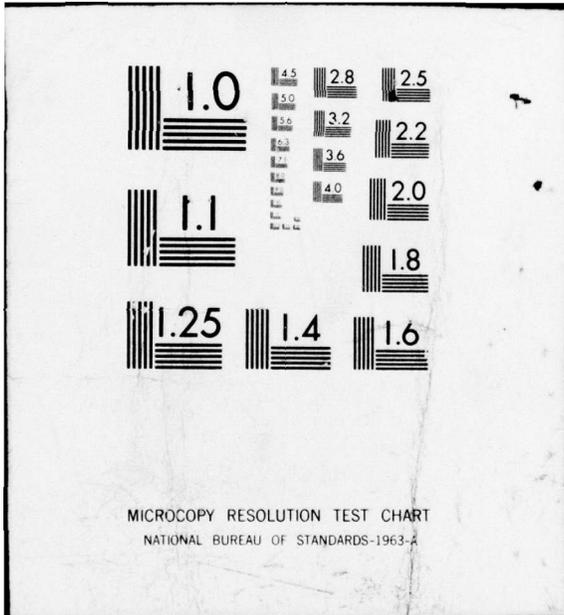
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UNITED STATES ARMY AVIATION BOARD  
Fort Rucker, Alabama

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10 SEP 1962

SUBJECT: Report of Test, Project No. AVN 3662, Evaluation of Consolidated Diesel Electric Corporation Oil Servicing Dispenser.

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TO: Commanding General  
U. S. Army Test and Evaluation Command  
ATTN: AMSTE-BG  
Aberdeen Proving Ground, Maryland

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NOV 8 1976

1. AUTHORITY.

a. Line Item No. F-812, Annex F, USCONARC Pamphlet No. 705-1, as changed.

b. Purpose. The purpose of this test was to conduct an evaluation of the Consolidated Diesel Electric Corporation Oil Servicing Dispenser to determine its suitability for Army use.

2. BACKGROUND.

a. The following paragraph 512e(3) is found in "General Objectives", Combat Development Objectives Guide, Change 3, 1 December 1960; "Development of aircraft accessory and supporting equipment and facilities should keep pace with improvements in major items of equipment. A continuing effort must be made to insure that essential maintenance and support equipment is air transportable to support fast moving situations. . . . Improved reliability and increased utilization of aircraft through advanced maintenance techniques and equipment is required . . . ."

b. The first prototype oil dispenser was developed for the United States Army Transportation Corps by Consolidated Diesel Electric Corporation and was evaluated during the period June - July

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1961, at the United States Army Transportation Test and Support Activity. The US Army Arctic Test Board commenced testing this dispenser in December 1961. Testing was terminated in March 1962 because of mechanical difficulties.

c. The Transportation Corps Army Air Support Equipment Evaluation Group requested that USCONARC perform user test on one of two additional modified units also developed by Consolidated Diesel Electric Corporation.

d. The Aviation Board requested a directive from USCONARC on 9 February 1962 (reference 8c). No reply has been received to date.

e. The dispenser was received from Consolidated Diesel Electric Corporation on 27 March 1962, and testing begun on 28 March 1962. A maintenance package was not received. A draft operation and maintenance instructions handbook was received.

3. DESCRIPTION OF MATERIEL. The oil servicing dispenser, mounted on a four-wheel trailer, is designed for aircraft servicing and can separately store and dispense three types of lubricating oil and one type of hydraulic fluid. There are one 100-gallon tank consisting of two 50-gallon containers and one 50-gallon tank consisting of one container. These normally would be used for reciprocating engine oil. Additionally, there are two two-gallon tanks, one of which normally would be used for turbine engine oil and one for hydraulic fluid. The unit is provided with two heaters for cold weather operation: one portable gasoline torch type and one a. c./d. c. 208 v./24v. electric type. The unit is provided with a gasoline engine and an electric motor. These utilize a common clutch, and either can be operated as a power source.

4. TESTS. The oil servicing dispenser was evaluated by Aviation Board personnel during the period, 28 March - 30 July 1962. Outside air temperatures ranged from 64°F. to 93°F. HU-1, H-21, H-37, AO-1, YAC-1, L-20, U-1, L-23, YL-26, L-28, and T-28 aircraft were serviced with the unit during this period.

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a. Physical Characteristics.

(1) The unit measured 77 inches wide, 96 inches long, and 55 inches high. It weighed 1690 pounds empty and 2750 pounds filled to capacity.

(2) The unit was sufficiently rugged for movement over rough terrain. However, towing at speeds over 10 m. p. h. on rough terrain and 20 m. p. h. on roads was not permitted.

b. Operational Characteristics.

(1) The dispensing nozzles were compatible with the aircraft serviced during the test. The dispensing gauges could not be seen by the operator during servicing; however, this was corrected by installing gauge-type nozzles.

(2) The rate of flow of oil was satisfactory under the temperature range encountered during this test. No problems attributable to climatic conditions were encountered. The filters were adequate to prevent oil contamination.

(3) The controls were adequate except that the main shut-off valve for the interconnected tanks was not readily accessible.

(4) The power sources were satisfactory except as noted below:

(a) The location of the gasoline-engine choke control required the operator to reach over the exhaust pipe.

(b) The hand crank forward-storage-position clamp chafed the lower cowling of the starter recoil assembly.

(5) The gasoline oil-heating unit was not safety-placarded to the effect that it should not be used in the vicinity of aircraft.

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c. Personnel.

(1) The dispenser could be operated by one man and no special skills were required. Personnel could be taught to operate and maintain the unit in approximately two hours.

(2) The handbook provided by the manufacturer was inadequate in that detailed instructions were not provided.

d. Tactical Suitability.

(1) No difficulty was encountered in servicing aircraft. The addition of a lightweight ladder to the unit would aid materially in servicing some of the larger aircraft where access to the oil inlet is difficult.

(2) No difficulty was encountered in filling or maintaining the unit.

(3) The operational portion of the unit was found to be sufficiently rugged to withstand simulated tactical operations. However, since the undercarriage was designed under the Military Specification Group for vehicles intended for operation at fixed installations and on hardstand surfaces, the mobility of the unit was unsatisfactory for tactical use. While the unit could be transported by an Army 2 1/2 ton truck and towed by standard Army vehicles, the small wheels, limited speeds, and lack of standard vehicle lights and brakes severely limited handling in mud and over rough terrain, and precluded safe towing in convoy at normal speeds.

(4) The unit was transported externally by H-34, and its size and weight indicate it could also be carried by the following aircraft:

(a) As an internal load:

1. AC-1

2. H-37

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3. HC-1

(b) As an external load:

1. H-37

2. HC-1

3. H-21

4. HU-1B

5. HU-1D

(5) The towing bar has an excessive amount of play at the vertical hinge joint resulting in excessive swaying while being towed.

f. Maintenance.

(1) Organizational maintenance could be performed by one man. The following problems were encountered:

(a) Gasoline-engine oil filler neck could not be serviced through the access door.

(b) Grease fittings on the single-tank dispensing pump were inaccessible.

(c) Gasoline-engine spark-plug lead wire chafed on the fly wheel cowling and the engine cylinder head.

(d) The "V" belt from the d. c. motor and the engine-driven clutch to the dispensing pumps could not be adjusted.

(e) The nuts on the engine and motor mountings were not secured to the frame, necessitating removal of the dispenser unit from the trailer to change the engine or the motor.

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(2) After two major breakdowns, the unit was returned to serviceable condition by factory personnel. These breakdowns consisted of:

(a) Failure of the gasoline engine fuel tank support bracket and oil drain pipe.

(b) Failure of the electric motor output shaft.

5. FINDINGS. This paragraph includes all deficiencies and those shortcomings which are considered significant enough to warrant corrective action.

a. Deficiencies. The following deficiencies require elimination in order to make the item acceptable for use on a minimum basis.

<u>DEFICIENCY</u>	<u>SUGGESTED CORRECTIVE ACTION</u>	<u>REMARKS</u>
The mobility of the present trailer is unsatisfactory for tactical use. The trailer conforms to MIL Spec. for Mobility Type II, Mobility Group C as outlined in MIL-M-8090.	For tactical suitability, conform to MIL Spec. for Mobility Type III as outlined in MIL-M-8090.	Consideration should be given to mounting the dispensing unit on the proposed Multi-Purpose Trailer and Pallet System being developed by USATRECOM (reference f).

b. Shortcomings. The following shortcomings should be corrected, if it can be done without unduly complicating the item or inducing another undesirable characteristic, either concurrently with elimination of deficiencies in paragraph 5, or in production engineering or by product improvement.



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<u>SHORTCOMINGS</u>	<u>SUGGESTED CORRECTIVE ACTION</u>	<u>REMARKS</u>
1. Gasoline engine oil filler neck is on the rear of the engine and cannot be serviced through the access door.	Reposition filler neck to afford easy servicing.	
2. Gasoline engine choke control is on the rear of the engine, requiring operator to reach over exhaust pipe.	Route to front for easy and safe access.	
3. Grease fittings on the single tank dispensing pump are inaccessible.	Provide access hole for ease of lubrication.	
4. Gasoline engine spark plug lead wire chafed on the fly wheel cowling and the engine head.	Provide an access hole with rubber grommet for lead wire.	
5. The hand crank forward storage position clamp chafed the lower cowling of the starter recoil assembly.	Reposition clamp.	
6. The portable gasoline heater is not safety placarded.	Placard both heater and heater access hole.	
7. The tow bar eye is too large for the standard tug pintle, but is satisfactory for the tactical vehicle pintle.	Provide a standard towing eye.	

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<u>SHORTCOMINGS</u>	<u>SUGGESTED CORRECTIVE ACTION</u>	<u>REMARKS</u>
8. The "V" belt from the clutch to the dispensing pumps has no provision for adjustment.	Provide a means of adjustment.	
9. The main shutoff valve for the interconnected tanks is not readily accessible.	Reposition shutoff valve.	
10. The filter for the interconnected tank is blocked by the single tank tubing from the instrument panel.	Reroute tubing.	
11. The towing bar has an excessive amount of play at the vertical hinge joint.	Provide a bushed, minimum tolerance joint.	
12. The nuts on the engine and motor mountings are not secured to the frame. This necessitates removal of the unit from the trailer to change engine or motor.	Provide a holding union for these nuts.	
13. Excessive engine vibration due to faulty governor adjustment caused damage to the engine fuel tank support bracket and engine oil drain pipe.	Provide adequate adjustment instructions in the handbook.	

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6. CONCLUSIONS.

a. The Consolidated Diesel Electric Corporation Oil Servicing Dispenser, as tested, is not suitable for tactical Army use.

b. Mounting the dispensing unit on the proposed Multi-Purpose Trailer and Pallet System, or a similar trailer, should make the item suitable for tactical Army use.

c. The Oil Servicing Dispenser offers sufficient potential to warrant further consideration for Army use.

7. RECOMMENDATIONS. It is recommended that:

a. The deficiency and shortcomings listed in paragraph 5 be corrected.

b. The modified unit be returned to this Board for check test.

8. REFERENCES.

a. Minutes, 5th Meeting, Transportation Corps Air Support Equipment Evaluation Group, 5, 6, 7 December 1961, held at U. S. Army Transportation Aircraft Test and Support Activity, Fort Rucker, Alabama.

b. End of Test Report, Project No. K-610405, Task No. K-20, "Test Report of Oil Dispensing Unit," 19 September 1961, Headquarters, U. S. Army Transportation Aircraft Test and Support Activity, Fort Rucker, Alabama.

c. Disposition Form, ATBG-ACAB, U. S. Army Aviation Board, 9 February 1962, subject: "Oil Servicing Dispenser."

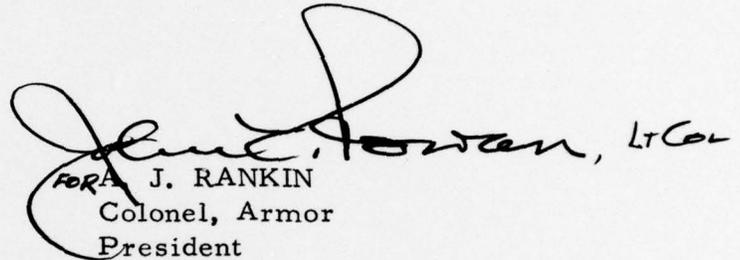
d. Plan of Test, Project No. AVN 3662, "Evaluation of the Consolidated Diesel Electric Oil Servicing Dispenser," U. S. Army Aviation Board, 14 May 1962.

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e. Letter, ATBG-SEC AVN 3662, U. S. Army Aviation Board, 21 June 1962, subject: "Plan of Test, Project No. AVN 3662."

f. Agenda Item 61-500/002/2, Minutes of the Fifth and Sixth Meetings, Transportation Corps Army Air Support Equipment Evaluation Group, held 5, 6, 7 December 1961 and 13, 14, 15 March 1962, at the U. S. Army Transportation Materiel Command, St Louis, Missouri.

  
FOR J. RANKIN  
Colonel, Armor  
President