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Abridgment

Costs of Operating Aircraft for Rural Traffic Enforcement

RICHARD A. RAUB AND BOBBY L. HENRY

This paper describes the cost of operating airplanes for law enforcement, including traffic patrol, in rural areas. Included are all costs associated with ownership and operation of airplanes, cost for pilots and support personnel, and the ground-support costs associated with enforcement of traffic laws. Total costs are approximately $96/h. Of this, 54 percent represent direct operating costs for the airplane, including fuel, periodic maintenance, and depreciation. An additional 34 percent of the costs are for salaries of the pilots, and the remaining 12 percent cover the overhead costs. When used for line patrol, the airplane costs $1.33/mile. Based on productivity of the pilots in Illinois, the cost per stop initiated by aerial patrol is $35. The use of the airplane solely for enforcement of the speed limit at fixed locations costs approximately $22/stop. Line patrol of highways with aircraft can be cost effective when compared with the same type of patrol by the officer on the ground. For enforcement of the speed limit at selected locations, an aircraft is substantially more expensive than a comparable operation that uses a radar operator and chase cars. A team of officers, including a radar operator, can perform the same task at approximately one-half the costs.

Although the hourly operating costs of airplane operation are high, the speed and coverage of airplanes make them practical to use for certain types of rural law enforcement. Aircraft are particularly superior for coverage of large areas. The area viewed from an aircraft for manhunts, searches, and general surveillance far exceeds that from the ground. The equipment, however, must be operated for traffic law enforcement in order to help offset the cost of purchase and storage.

Except for a report completed for the Illinois State Police (ISP) in 1979 (1), most other studies of aircraft costs have included only the direct costs of operation. Costs for fixed-wing aircraft ranged from $7.00-$43.76/h (2,3). Hourly costs for operating helicopters ranged from $23.01-$119.64 (2-5). The higher costs of helicopters tend do limit their use to metropolitan areas where the ability to hover and land at practically any location help outweigh the higher costs. The primary defect with the study for the ISP in 1979, which included an hourly operating cost of $137.42, was that it examined such costs under a specific operating policy. The costs in this report, which were derived from the methodology of the 1979 report, are presented in a more general fashion.

OPERATING COSTS

The operating costs for the aircraft include costs for depreciation, hangars, commodities, fuel, oil, and maintenance. Personnel costs are separated in the table below into the fixed cost of the chief pilot and secretary and the hourly costs of the 14 police officers who are the pilots:

Operating Cost	Item
Fixed	Chief pilot and secretary
	Hangar and office insurance
	Charts and other
Variable	Pilot salaries
	Depreciation
	Fuel and oil
	Periodic maintenance
Ground support officers	Drivers
	Assistants

Excluded from the cost of the police officers is their training and supervision on the basis that these same costs would be incurred if they were not flying. On the other hand, costs for pilot training are included. Finally, the costs of ground support are added. Such support is required to cite a traffic violation, investigate a disabled vehicle, or handle an accident reported by a pilot.

Fixed costs for the ISP aerial patrol in FY 81 (July 1, 1980 to June 30, 1981) were $83 950. Approximately 50 percent of those costs were for personnel. Variable costs added another $594 750, for a total annual cost of $678 700. Of the variable costs, 38.3 percent were costs for pilots. During FY 81, the seven aircraft in the fleet were flown 7080 h in law enforcement. More than 1000 additional hours were flown for maintenance, proficiency checks, training, and meetings, but these are considered a fixed cost of operation. Thus, based on the 7080 h of operation, Table 1 shows an average hourly cost of $95.80.

Added to the costs of operating the aircraft are those of ground assistance associated with enforcing

Table 1. Summary of airplane costs (FY 1981).

Cost	Total ($)	Cost per Hour of Law Enforcement ($)	Percentage of Total
Fixed	83 950	11.86	12.4
Variable			
Pilots	227 970	32.20	33.5
Depreciation	72 290	10.21	10.7
Fuel and oil	166 340	23.49	24.5
Periodic maintenance	128 150	18.10	18.9
Total	678 700	95.86	

Table 2. Cost of aerial patrols.

Item	Line Patrol[a] ($)	Speed Enforcement[b] ($)	Item	Line Patrol[a] ($)	Speed Enforcement[b] ($)
Airplane	450.54	249.24[c]	Cost per hour	159.36	247.54
Ground	164.97	105.76	Cost per stop	35.33	22.30
Court	133.46	140.08	Cost per mile	1.33	
Total	748.97	495.08			

[a]Cost calculations based on 4.7 h of work, during which 565 miles are driven and 21.2 stops made.
[b]Cost calculations based on 2.0 h of work, during which 22.2 stops are made (three officers each assist at 3.7 stops/h).
[c]The airplane also flies 0.6-h trip to and from the zone.

Table 3. Cost for alternate modes (ground officers).

Item	Line Patrol[a] ($)	Radar Team[b] ($)	Item	Line Patrol[a] ($)	Radar Team[b] ($)
Costs			Cost per hour	29.59	96.10
Ground	156.07	141.00	Cost per stop	49.32	11.86
Court	6.70	51.19[c]	Cost per mile	1.09	
Total	162.77	192.10			

[a]Cost calculations based on 5.5 h of work, during which 149 miles are driven and 3.3 stops made.
[b]Cost calculations based on 2.0 h of work, during which 16.2 stops are made (three officers each make 2.7 stops/h).
[c]Radar operator and arresting officer must attend court.

traffic laws and other services to the motoring public. How the assistance is given makes a difference in how the cost is assigned. The table below shows the costs when an officer leaves a patrol, assists the pilots, then returns. It also shows the cost where the officer serves as an interceptor for speed enforcement. The costs are based on personnel costs of $12.11/h and automobile costs of $0.28/mile. Some costs are also associated with driving to make the stop or to set up a speed-enforcement detail.

Item	Cost ($)
Single Traffic Action	
Driving	2.80
Officer's time	5.05
Total	7.85
Two-Hour Speed Enforcement Detail	
Driving and set up	11.03
Officer's time	24.22
Total	35.25

One final element is the cost of court attendance. Data from ISP records show that the officer spends an average of 2.1 h in court/appearance. If the officer is a pilot, that appearance often involves a flight to and from the county where court is held. Therefore, the cost for the pilot also includes flight. On the average, 3.9 percent of all traffic citations are contested. In 1980, of the 26 600 citations issued by pilots, 1040 were contested. The table below shows that the average court cost for each citation is $1.58 for the ground officer and $4.73 for the pilot.

COST FOR USE OF AIRCRAFT

ISP have used the aircraft for two different types of traffic enforcement: line patrol of Interstate highways and speed enforcement at marked zones (6,7). The cost for each of these operations differs. For line patrol, the pilot will cover 565 miles of highways and initiate 21.2 stops for traffic law violations. As shown in Table 2, a shift of line patrol that includes 4.7 h of flying will cost $748.97 or $159.36/h. On the other hand, a 2-h segment of speed enforcement by three ground officers who assist as interceptors will cost $247.54/h. The line patrol costs $35.33 for each stop made; speed enforcement costs $22.30 for each stop made.

COSTS FOR ALTERNATE MODES

A single officer on line patrol of an Interstate will cover 149 miles, will initiate 3.3 stops for traffic violations, and will cost $159.36/shift of 5.5 h. As shown in Table 3, the cost per hour and mile of patrol is less than that of the airplane, but the cost per action taken is 40 percent higher. However, to match the activity of a pilot in an aircraft would require 6.4 officers on the ground at a cost of $1041.73 compared with the cost of $748.97 for the airplane.

	Court Appearance	
	Ground	
Item	Officer	Pilot
Travel		
Time (h)	0.6	1.0
Cost ($)	15.17	95.86
In court		
Time (h)	2.1	2.1
Cost ($)	25.43	25.43
Total cost ($)	40.60	121.29
Cost per citation ($)	1.58	4.73

Although the line patrol by aircraft may be more cost effective than conventional ground patrol, the same does not appear true for speed enforcement. The average cost for a stop use of a radar operator and three intercepting officers, even though each officer is less productive, is estimated to cost approximately one-half the amount per stop as the cost of an airplane. For the airplane to achieve a common economic position with a radar and chase car team would require a minimum of a threefold increase in productivity on the part of officers who assist the airplane. Given the time required for an officer to process a citation, such a threefold increase would not appear possible. On the other hand, because the airplane is rarely detected (as opposed to a radar operator), it has an intrinsic value in terms of identifying flagrant violators who might otherwise avoid the radar operator.

SUMMARY

If the airplane is used for law enforcement purposes of any form, the base cost will be $95.86/h. This would apply to manhunts, surveillance, photographic sessions, and other related activity. Use for traf-

fic enforcement increases the hourly cost, depending on the type of use. For patrol of a highway, including the activity generated, the costs rise to $59.36/h. The use of the airplane for speed enforcement is more expensive--$247.54/h (for a two-hour session). Its use is practical only because it is more covert than radar. The airplane is superior for manhunts and related activity. It appears also to be cost effective for line patrol. Without substantial improvement in productivity of the ground support, its use for speed enforcement may not be cost effective.

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Truck Safety, Regulation, Inspection, and Enforcement in Virginia

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An investigation of state and federal regulations, inspection programs, and enforcement activities regarding truck safety was carried out to ascertain whether there were problems with the state's regulations and activity in these areas and to suggest remedial measures for any problems identified. The research, carried out with guidance from a project advisory group, included a review of relevant literature; a questionnaire survey of state enforcement programs; observations of on-road safety inspections; a review and comparison of state and federal laws and regulations that govern the trucking industry, including those that deal with hazardous materials; and an analysis of available data concerning truck accidents, registrations, miles of travel, vehicle type, load carried, and percentage of overloaded trucks. It was concluded that some revisions to the regulatory provisions that govern the trucking industry and the transportation of hazardous materials in Virginia were warranted and appropriate. Recommendations for the revision of some of the state's regulations and enforcement program activities were offered.

A great deal of attention has been focused on the safety aspects of the movement of goods by heavy trucks. Both state and federal governments have shown concern about statistics that indicate a significant increase in the involvement of heavy trucks in traffic crashes and fatalities. The response at the federal level included the introduction of the Truck Safety Act of 1978 and the Trucking Competition and Safety Act of 1979. These represent an effort to reduce crashes, injuries, and property damage; to provide drivers of commercial vehicles with safe and healthy working conditions; and to increase compliance with current regulations. Legislation has also been introduced to set national truck weight and length limits.

A 1977 General Accounting Office report to Congress stated that 20 percent of all traffic deaths resulted from truck and bus crashes and recommended an increase in funds for safety activities (1). A 1979 study by the same agency determined that "excessive truck weight is a major cause of highway damage," but the study did not deal directly with the relation between truck weight and crashes (2).

A study by the National Highway Traffic Safety Administration (NHTSA) found that, between 1975 and 1978, fatal crashes that involved heavy trucks increased by 40 percent; 10 percent of all fatalities on the nation's highways were related to accidents that involved heavy trucks; and fatal injuries to the occupants of passenger cars that collided with heavy trucks increased by nearly 30 percent (3).

The popular press, newspapers, and magazines have given considerable attention to crashes that involve heavy trucks, especially when multiple fatalities have occurred or when hazardous materials have been involved. A number of exposé articles have detailed a calculated disregard for weight and safety regulations by certain truckers.

In light of the above, officials of the Commonwealth of Virginia requested a study of the state's safety, regulation, inspection, and enforcement programs that deal with heavy trucks.