

Aviation remains a crucial industry in the state of North Carolina adding an estimated \$ 9.5 B to the state economy per year. While the NC DOT - Division of Aviation has developed a very comprehensive plan for General Aviation Airports, the state has failed to secure sufficient funding to implement the plan. The significant funding shortfall is resulting in the deterioration of the existing system of airports in the state. More funding is needed to insure that the system is maintained and necessary improvements are made to accommodate increasing demand and maintain safety and security.

An overall assessment of the condition of the North Carolina aviation infrastructure was conducted taking into account pavement conditions, funding, safety, and passenger cost/satisfaction. **A rating of D+ was assessed.**

BACKGROUND

North Carolina is the birthplace of the aviation industry and infrastructure as it is the place where Orville and Wilbur Wright made their first flight in 1903. Since then, aviation has become a very vital part of the infrastructure opening up the state to both national and international access and adding an estimated \$ 9.5 B per year to the North Carolina economy.

There are 91 publicly owned airports and heliports in the state, of which 11 are classified as Air Carrier (AC) Airports and receive their federal funds directly from FAA and state funds from the Division of Aviation. 63 airports are classified as General Aviation (GA) airports and receive federal and state funds that are administered by the Division of Aviation. The remaining 16 airports are GA airports listed as Private Use and do not receive government funding. These airports handle approximately 35 million passengers per year. Two of the airports, Charlotte Douglas International and Raleigh-Durham International, are in the top 50 airports in the nation by passengers enplaned, and a third one, Piedmont Triad International handles more than 1 million passenger enplanements per year. Number of passengers using the Charlotte Douglas Airport in 2005 was 28 M, a 12% year-to-year growth. The 63 GA airports accommodate 5,620 based active aircraft that collectively log 770,000 hours per year flight time.

In general, the aviation industry, including the one in North Carolina, was profoundly impacted by September 11, 2001. A net result is that FAA and local funds and attention had to be diverted from infrastructure issues to security as a wide range

of security investments had to be made in order to bring airports up to new Homeland Security standards. The recent period has also seen tremendous economic pressure on the commercial airline industry driven by significant increases in costs, drop in passenger traffic, and more recently a large increase in fuel costs. The Charlotte Douglas International Airport, the largest airport in the state, was particularly affected because of its high dependency on US Airways as one of its major hubs and headquarters. US Airways had to go through significant cost cutting measures under Chapter 11 protection and restructure the way it does business in order to survive. More recently it emerged from Chapter 11 and merged with America West and reported significant profit in their Q2, 2006 results indicating that it is now healthy and will continue to use Charlotte as a major hub.

In the past few years, consumer confidence has been restored and demand for air travel is on the rebound. Projections for the future are for continued growth. The NC Aviation industry must be ready to accommodate this growth to avoid costly delays in the future.

At current funding levels, it will not be possible for the GA airports, and to a lesser extent for the Air Carrier airports, to fund capacity improvements to keep pace with demand.

In order to assess the condition of the North Carolina aviation infrastructure, pavement conditions, funding vs. needs, safety, and passenger costs and satisfaction were considered as detailed in the next section.

CONDITIONS

Pavement Condition Index (PCI)

Public Law 103-305, section 107, amended Title 49, Section 47105, of the United States Code mandates sponsors provide assurances on preventative maintenance for project applications involving airfield pavements. For any pavement rehabilitation reconstruction project, each airport sponsor must provide assurances to the FAA that they have implemented an effective pavement maintenance management program. The amendment also provides for the submittal of reports addressing the pavement condition and the management program.

The requirement to establish a pavement maintenance management program applies to any pavement at the airport which has been constructed, reconstructed, or repaired, with federal assistance. All grants involving pavement rehabilitation or reconstruction contain a grant assurance that addresses the pavement maintenance obligation. FAA Advisory Circular 150/5380-6, Guidelines and Procedures for Maintenance of Airport Pavements, is used for specific guidelines and procedures for maintaining airport pavements and establishing

an effective maintenance program. Specific types of distress, their probable causes, inspection guidelines, and recommended methods of repair are presented.

The NCDOT Division of Aviation undertook a comprehensive initiative in 2004, referred to as the “North Carolina General Aviation Airport Development Plan” which focused on the airports under its jurisdiction. This plan evaluated the needs at the general aviation airports and set minimum state standards for their development. In this plan the airport needs in the system were identified and prioritized.

One of the requirements for capital improvements and maintenance established was to institute the FAA mandated maintenance management program. As part of this program a Pavement Condition Index (PCI index) of all pavements was established to monitor and assess the aging of pavement over time. The initial PCI survey was conducted in 2002 and updated in 2004.

Findings of the PCI survey were as follows:

2004 NC Pavement Management System Database (2002 data in red)

59 Publicly Owned/Operated General Aviation Airports

Primary Pavement Only

Section	Number	% Area	Wt. Avg. PCI	PCI Rating	Pavement Area (sf)
Runway	112	54	75 (74)	Fair	26,693,376
Taxiway	174	24	75 (79)	Fair	11,705,127
Apron	<u>153</u>	23	76 (76)	Good	<u>11,305,229</u>
	439				49,703,732
					48,341,646

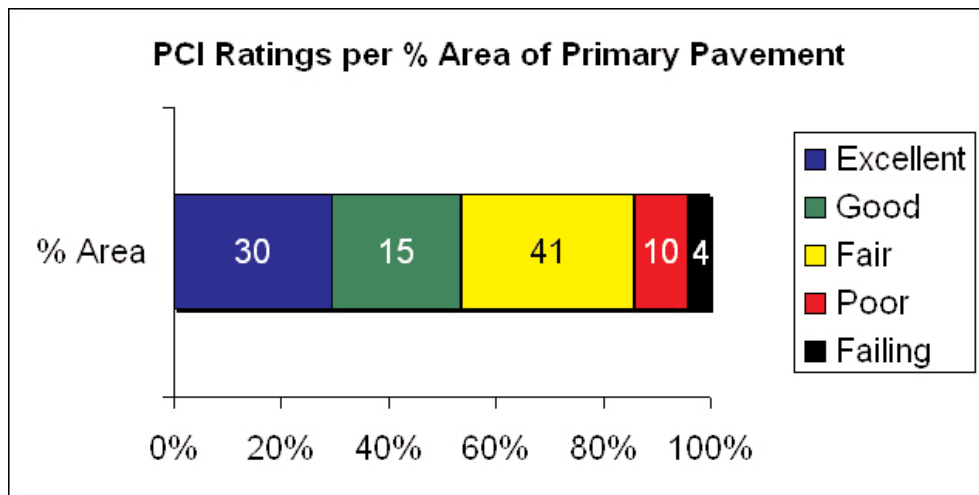
2,070,989 ft @ 24' wide
392 miles @ 24' wide

662,716 ft @ 75' wide
133 5000' long runways @ 75' wide

5,522,637 sq yds
\$138,065,923 pavement worth @ \$25/sq yd (not including land, drainage, markings, etc...)

5,371,294 sq yds

Color	PCI Range	PCI Rating	2004		2002	
			No. of Sections	% Area	No. of Sections	% Area
Blue	Excellent	89-100	154	30	125	29
Green	Good	76-88	50	15	89	24
Yellow	Fair	55-75	167	41	138	32
Red	Poor	40-54	48	10	40	10
Black	Failing	0-39	20	4	27	4



Data Analysis - May 16, 2005

*Does not include Anson County or updated Shelby Municipal sections.

** 2002 Data Shown in Red

This data indicates that the pavements tested have gotten worse over the test periods, as pavements considered good to excellent decreased from 53% to 45%.

No similar data was available for the Air Carrier airports, but these are considered better in light of extensive pavement management programs, and recent new construction activity.

Funding

In 1987, the NC General Assembly revised its aviation funding approach to credit the aviation users with the general taxes paid into the state treasury. While North Carolina does not have any aviation-specific taxes like some other states (i.e. fuel tax, registration fee, etc.), each purchaser of aviation products and services is subject to payment of the statewide 4% sales tax. The Continuing Aviation Appropriations statute passed by the legislature in 1987 provides that the Department of Revenue will, each year, develop an estimate of the total amount of sales taxes paid on aviation products and services and that figure will then be used by the General Assembly in setting the biennial amount of the State Aid to

Airports Program. Although this statute was modified in recent years to reflect growth rates associated with North Carolina's General Fund, the program has grown to in excess of \$10 million and has allowed the development of a more reliable multi-year aviation funding program for use in the DOT's Transportation Improvement Program. Recent state budget cuts, however, have had a negative impact on the program. In addition, each NC county collects personal property taxes from aircraft owners annually. These taxes go into the county's general fund and are generally not earmarked for investment into the local airport. NCDOT Division of Aviation administers the State Aid to Airports Program. North Carolina participates in the FAA "Block Grant Program", meaning the state has assumed responsibility for administration and distribution of FAA grants to general aviation airports. Commercial Service airports in the state deal directly with the FAA in regard to their Airport Improvement Program (AIP) funding.

2006 Recommendations made to the Council and approved for funding is shown below:

**Fiscal Year 2006
Recommendations to NC Aeronautics Council
March 21, 2006**

State Aid to Airports Program

General Aviation Airports

Airport	Description	State Funds	Local Funds	Total Funds
Andrews - Murphy	Complete Pavement Rehabilitation and Overlay	200,000	22,222	222,222
Anson County	Parallel Taxiway and Apron Rehabilitation - Phased Project	693,000	77,000	770,000
Ashe County	Match Division of Highways Funding for Airport Road Relocation	500,000	55,556	555,556
Concord Regional	Land Reimbursement - Original Airport Construction	100,000	25,000	125,000
Gastonia Municipal	Rehabilitate Apron	199,879	22,209	222,088
Halifax - Northampton County	New Airport Construction - Next Phase - Paving Primary Surfaces	1,000,000	111,111	1,111,111
Hamett County	Extend Runway Safety Area and Glideslope Area Site Prep	180,000	20,000	200,000
Lumberton Municipal	Rehabilitate Runway - Phased Project	1,000,000	111,111	1,111,111
Michael J. Smith	Land Acquisition for Runway Protection Zone	250,000	27,778	277,778
Morganton - Lenoir	Reimbursement for Partial Parallel Taxiway Construction	455,277	50,586	505,863
Person County	Purchase and Install Approach Lighting System	495,000	55,000	550,000
	Total	\$5,073,156	\$577,573	\$5,650,729

State Aid to Airports Total \$11,634,198

The NC General Aviation Plan for 2007-2011 has identified a need for \$ 588 M over the period to bring all airports in the program to the state recommended standards. The recently released 25-year AVIATION plan identified the funding need for the 25 year timeframe at \$ 1.72 B, of which \$ 733 M is needed for preservation of current GA airports, \$ 261 M for modernization, and \$ 727 M for expansion needs. In addition, while the current focus of aviation security continues to be commercial service airlines, the natural outgrowth of those programs will be increased security requirements at general aviation facilities, requiring additional yet undefined funding. At the present funding levels only critical issues where pavements are either failing or very poor can be addressed, and is insufficient to appropriately address needs identified in the plans. FAA has granted funding through the AIP program which helps in narrowing the gap, but levels are inadequate. For the next fiscal year, FAA has allocated approximately \$ 9 M to GA airports in NC. At this level of funding it is expected that the general aviation infrastructure will continue to deteriorate.

Safety

Only 16 incidents/accidents have been reported so far at NC airports in 2006 vs. 26 in the same period in 2005. Total for 2005 was 42 incidents. Two of the accidents in 2006 resulted in fatalities (2 – One in Hickory, the other in Wilkesboro) vs. 3

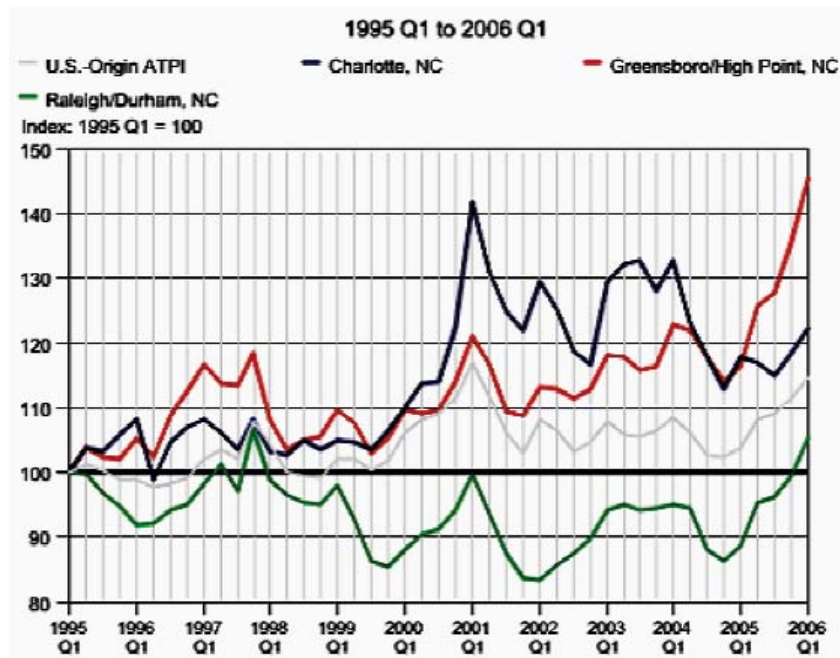
in the same period in 2005. In all of 2005, 10 aviation related fatalities were reported in the state. While a number of these accidents are still under investigation, in general causes for these accidents appear to be either pilot error or equipment (e.g aircraft) malfunction. Improvement in accidents and fatalities indicate that safety programs and their implementation are having a positive effect.

Local and state authorities are to be commended for their efforts in this area.

Passenger Costs / Satisfaction

Statistics and assessment in this area are based only on the major airports in the state.

Relative price per flight is monitored by the US Bureau of Transportation statistics and normalized on a regular basis. In the chart below pricing is compared to a national average (see gray line) for the three major airports in the state. The Raleigh Durham International Airport consistently provided better fares than the national average. Both the Charlotte Douglas International Airport and the Piedmont Triad International Airport (Greensboro) are consistently above national averages, although in the past 12 months prices in Charlotte have come a lot closer to the average while Greensboro prices have increased substantially.



When normalized for traffic, overall prices come close to the national average across the 3 airports.

	Arr	Dep
Asheville	77.9	81.4
Charlotte	79.4	80.0
Fayetteville	75.0	77.5
Greensboro	71.2	76.5
Kinston	71.0	83.9
Raleigh/Durham	73.6	77.8

Statistics for the last twelve months show that ontime arrival and departures percentage over the last 12 months are as follows:

On a more detailed analysis for 2006 through May the 3 major airports fared as follows

	ONTIME		ARRIVAL		FLIGHTS		
AIRPORT	ARRIVAL	ONTIME %	DELAYS	DELAY %	CANCELLED	CANCEL %	DIVERTED
Charlotte	38,744	80.4%	8,699	18.1%	670	1.4%	80
Greensboro	4,223	73.8%	1,353	23.6%	144	2.5%	5
Raleigh	17,189	76.3%	4,916	21.8%	381	1.7%	36
Total	60,156	78.7%	14,968	19.6%	1,195	1.6%	121
All Airports	2,249,393	77.4%	608,211	20.9%	42,326	1.5%	5,996

	ONTIME		DEPARTURE		FLIGHTS		
AIRPORT	DEPARTURE	ONTIME %	DELAYS	DELAY %	CANCELLED	CANCEL %	
Charlotte	38,879	80.7%	8,719	18.1%	590	1.2%	
Greensboro	4,476	78.1%	1,108	19.3%	146	2.6%	
Raleigh	18,094	80.4%	4,033	17.9%	364	1.6%	
Total	61,449	80.4%	13,860	18.1%	1,100	1.4%	
All Airports	2,321,365	79.9%	542,237	18.7%	42,323	1.5%	

In general the 3 major airports were close to the national average in terms of on time arrivals and departures.

In a 2006 North America Airport Satisfaction study conducted by JD Power and Associates whereby they developed an Airport Satisfaction Index based on a 1,000 point scale, in the Medium Airport Rankings (10-30 M passengers per year) Charlotte scored 675 points vs. a median

of 685 (range 626-722), and Raleigh scored 691 in the Small Airport Ranking (< 10 M passengers per year) against an average score of 692 (Range 654-718).

The Transportation Security Administration (TSA) conducts a survey to determine how passengers react to TSA screening at a number of TSA airports including Charlotte. In the 2005 survey Charlotte ranked 3-5% higher than the national average.

GRADE

The overall grade was derived by weighing ratings for each category. Pavement Condition rating and Funding accounted for 30% each, Safety and Passenger Cost/Satisfaction accounted for 20% each.

For Pavement Condition rating using a grading system based on % of pavements rated Good or Excellent the grade for this section was F. The grade was upgraded to a D overall based on better conditions at the Air Carrier airports. The plan developed to address the GA airport's pavement is very good and deserved a grade of B or better, however the low PCI results are due to insufficient funds available to the general aviation airports to implement the plan.

Due to the significant shortfall in funding both for the short and long terms, grade for this section is F. It will be crucial for this situation to be resolved in order to maintain a safe and reliable General Aviation system in the state.

A grade of B has been assigned for safety because no fatalities should be the goal.

In terms of passenger cost/satisfaction, North Carolina ranked average in all categories reviewed and was thus given a C grade in this category.

The overall grade using the above allocation was D +.

POLICY OPTIONS

North Carolina is projected to continue being one of the fastest growing states in terms of population and as a consequence there will be increased demand on aviation facilities. While the NCDOT Division of Aviation has developed a very comprehensive plan for the General Aviation airports under its jurisdiction, the funding necessary to implement the plans is woefully insufficient. An estimated funding shortfall of \$ 400-500 M over the next 5 years is certain to continue deterioration of the present General Aviation airport infrastructure. Expected shortfall is significantly larger for the 25-year Plan. Funding for the Air Carrier airports is mainly derived from the FAA through the Airport Improvement Program (AIP). This program funding relies partially on revenues generated by federal airline ticket taxes and fees. While still short of needs, it has been adequate to address immediate needs, while the shortfall in General Aviation is reaching a crucial stage. While FAA funds have helped in implementing some of the most crucial needs, significant additional funds need to be derived from state and local sources.

The 2004 Pavement Condition Survey indicates that pavement ratings are getting worse over the last 5 years pointing to insufficient investment of funding at the federal, state and local levels. Pavements that were rated good a few years ago now are slipping into lower rated categories. A significant part of the reason for these lower ratings is that many of the pavements have now reached or exceeded their design life. Funding has not kept pace with the need to enact repairs or increase capacity.

Both commercial service and general aviation airports should also take advantage of the latest advances in research regarding pavements developed under the Innovative Pavement Research Program (IPRF) and implement new design and maintenance practices.

Performance on safety has been very good in the state. Statistics indicate that safety is improving over time. Safety should be kept as a high priority and present plans continue to be funded and supported by the aviation industry.

Every step possible should be taken to insure that quality is improved. A number of innovative approaches that have been successful in other states could be more widely implemented such as Design/Build options and value engineering. Contracting practices should be reviewed, e.g. lowest initial cost is not necessarily the lowest cost for the consumer when taking into account delays, change orders, credit and bonding issues. Hold industry more responsible for the pavements they place under contracts. Use less prescriptive requirements and move toward performance based specifications.

An education program for the elected officials and the public should be instituted highlighting the importance of the aviation industry to continued growth and the economy of the state of North Carolina. A thriving aviation economy will attract new industry, jobs and mobility to the state of North Carolina.

RECOMMENDATIONS

The North Carolina Section of the American Society of Civil Engineers specifically supports the following recommendations:

- Support efforts to implement newer, more innovative construction delivery practices such as Design/Build, Design/Build/manage
- Encourage development of realistic, fact based Life-Cycle costs analysis methods and implement them as primary decision tools as opposed to “lowest price”
- Encourage practices for lowering overall costs of construction by implementing value engineering principles.
- Consider alternatives for increasing funds available for general aviation airports through alternative funding sources such as state and local fuel taxes and user fees, additional bond issues, etc.
- Consider opportunities to earmark aircraft property taxes for airport improvements.
- Encourage local politicians to work diligently in the legislature to secure significant additional funds to support the General Aviation plan.
- Encourage a shift from prescriptive specifications to performance based specifications.
- Increase design life for pavements by increasing utilization of new technologies such as those developed under the IPRF program.

SOURCES

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