



Chapter 6

Other Factors for Consideration

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Safety

Highway Safety

In 1998 the American Association of State Highway and Transportation Officials (AASHTO) published a Strategic Highway Safety Plan. The plan identified strategies to address safety issues relating to drivers, pedestrians, bicyclists, vehicles, roadways, emergency medical services, and information management.

Although KDOT has no formal strategic plan similar to AASHTO, many safety-related efforts have been initiated in the areas of design, construction and maintenance practices, research, and application of traffic control devices such as signals, signs, and pavement markings. KDOT has also initiated significant public awareness, enforcement, and education efforts aimed at driver behavior.

More than 40 years of public policy, roadway engineering and automobile design have contributed greatly to the safe travel of the motoring public, yet driver error continues to be the overwhelming cause of crashes. While technological advances deserve further investigation of incorporation into the traffic safety areas of education, engineering, enforcement, and emergency response, addressing highway safety through a comprehensive, multi-disciplinary manner will be key to ensuring that all opportunities to improve safety are identified, considered, implemented when and where appropriate, and evaluated.

The single most important issue traffic safety advocates can promote to reduce the incidence of serious and fatal injuries resulting from motor vehicle crashes is to encourage the proper use of safety belts and child restraints. It is essential that increasing efforts be made for public awareness, enforcement and education to the negative effects of making unhealthy decisions when traveling. In 2000, KDOT initiated a driver education program Kansas Driving - "Safe. Not Sorry" to re-educate drivers of the basics of traveling safely on Kansas roadways. The program presents basic driver skills including using courtesy and common sense when navigating roadways and includes engineering and environmental factors that drivers face.

On October 10, 2001, KDOT joined other states and organizations by participating in the first "Put the Brakes on Fatalities Day." This proposed annual event, patterned after the "Great American Smokeout", was created to make motorists aware that approximately 114 fatalities occur every day, or one fatality every 13 minutes. KDOT hopes that by annually participating in this national event, the benefits of all safety programs can be realized on one day and the number of fatalities nationwide can be reduced to zero.

Alcohol continues to play a major role in traffic crashes, injuries and fatalities. While crashes involving alcohol impairment have decreased significantly since 1985, the decline in alcohol-related fatalities cannot be credited to a single factor. Undoubtedly, part of the credit for the decrease was the National Uniform Minimum Age Drinking Act, passed in 1984, which raised the drinking age to 21. Additionally, the increased social intolerance of drinking and driving reinforced by lowering blood alcohol content (BAC) levels and by groups such as Mothers Against Drunk Driving has had a considerable influence. Continued enforcement of zero tolerance laws for underage drinkers is imperative to curb the frequency of alcohol-related injuries to this age group.

Crashes involving deer are a problem nationwide. The number of deer/vehicle collisions reached 10,184 in 2001, or 13% of all crashes in Kansas, and spurred the state Legislature to permit the Kansas Department of Wildlife and Parks to extend the deer-hunting season and increase the number of deer permits issued. Additionally, KDOT traffic engineers are testing variations of roadside hardware, and examining the effectiveness of other methods used around the country to reduce deer-related crashes.

Traffic law enforcement presents a number of challenges, problems, and issues for the future as the numbers of drivers increases, miles driven per year continues to rise and urban roadways become more congested. Technology deployment will reduce some law enforcement labor, but strategies must be developed to make technology and information available to assist law enforcement in doing more with less.

In addition to technological advances applied toward roadway design and traffic management systems, information technology can yield comprehensive traffic crash data that can dramatically affect the ability to identify highway safety factors and promote sound management decisions. In 1999, KDOT recognized the need to implement an enterprise-wide system and began participating in a nationally collaborative effort to develop a Transportation Safety Information Management System (TSIMS). The system will process (capture, store, transfer and analyze) traffic crash data with connections to other state data systems comprising traffic records (driver history, licensing, roadway location, patient injury/treatment) while assuring the ability to apply the technology (and system) to other information flows (Emergency Medical Services run reporting, traffic citations).

While road design, construction, maintenance, and traffic operation safety issues should continue to be explored, social behavior is the target with the greatest potential to improve highway safety within the foreseeable future. It will be imperative to raise the awareness of vehicle users regarding safe driving practices and techniques. Preventive educational programming will continue to be paramount to harm reduction in the traffic safety arena.

Road Safety Audits

KDOT's Bureau of Traffic Engineering uses the Road Safety Audit (RSA) process to identify locations that may require road safety improvements. The audit process provides KDOT with a county-by-county traffic study of the Kansas state highway system. The audit consists of three phases: office review, field review, and a report, and will be updated every three to four years.

During the office review phase accident data along all state routes in a county are analyzed. This will identify high accident locations and definable accident patterns that may be corrected through changes in roadway geometrics or the use of traffic control devices. Other sources of data are also reviewed, which include, video-logs, past traffic study files, and traffic control resolutions.

A field review of state routes provides information on a variety of traffic-related factors including roadway characteristics, geometry, railroad, speed limits, sight distance, pavement markings, signing, and other traffic control devices.

Once the field review is complete, necessary traffic field data such as traffic counts, speed data, and school data is obtained. The data is analyzed and presented along with any recommendations in a final report. The report is sent to the county, cities, and KDOT offices both for information and the execution of recommendations.²⁷

Research

KDOT is actively engaged in research and development activities both nationally and at the state level. Under the direction of KDOT research committees, new technologies from national and state research programs are evaluated and implemented into routine practice. In addition to research conducted internally, we participate in many cooperative research activities.

The Future Strategic Highway Research Program (F-SHRP) is a major (\$450-\$500M) special-purpose national research program that is expected to be included in the next Federal Surface Transportation legislation. As proposed, this research program would focus on four strategic areas: renewal, safety, reliability, and capacity with a goal to make a significant difference in the state of practice in these areas. As with the first Strategic Highway Research Program completed in the early 1990's, KDOT expects to establish a formal internal program to carefully evaluate and then implement procedures and products found to be of benefit to Kansas.

Internally, KDOT primarily conducts applied research on specific needs of the State's road system. Research products can include development of experimental hardware, but are usually reports documenting the research results. To be cost effective, Research, Development, and Technology Transfer (RD&T) must do one or more of several things: increase safety, reduce waste, increase personnel efficiency or production,

eliminate unneeded work, or extend service life of pavements. KDOT research has been shown to be highly cost-effective.

KDOT also participates in cooperative research activities with other state and national agencies. The University of Kansas Transportation Center operates a Technology Transfer Center for Local Transportation agencies under an agreement with KDOT and FHWA. Kansas Transportation Research and New Developments (K-TRAN) is a cooperative transportation research program among the Kansas Department of Transportation, Kansas State University, and the University of Kansas. The K-TRAN Program is currently budgeted at \$700,000 per year and has been highly successful, showing an overall benefit to cost ratio of 11.1 to 1 in the 2001 assessment of triennial benefits. A revision to the K-TRAN master agreement to include all university RD&T and guarantee a funding level of \$350,000 per university per year was signed in January 2000.

Security and Emergency Response

In emergencies, KDOT strives to maintain the integrity and usefulness of the transportation system, to restore the transportation system to a usable condition, and to provide such other support activities as may be required to restore traffic movement and protect citizens' health and safety.

KDOT deals regularly with emergencies such as traffic accidents (which may include hazardous materials), flooding, debris removal, blizzard conditions, and damage assessment. KDOT also participates regularly in planned training exercises with the Division of Emergency Management, Kansas National Guard, Wolf Creek Nuclear Facility and Cooper Nuclear Station. These exercises include both manmade and natural disasters.

KDOT is also represented on the state Commission on Emergency Planning and Response. The Governor created this commission in 1999 to replace the State Emergency Response Commission. The new commission was formed to facilitate a more coordinated effort for the planning, preparation, response and mitigation of emergencies for the state.

Enhancements to the statewide 800 MHz radio system throughout the next few years can provide KDOT and public safety personnel in the State of Kansas the opportunity to utilize the radio system to improve response times to incidents while providing communications inter-operability between agencies where it is necessary and applicable. Enhancements to the current 800 MHz radio system would include the following:

Statewide Trunking: Trunked radio systems offer greater system flexibility and system management. Resources are used more efficiently,

multiple users have radio access simultaneously, multiple talkgroups, emergency call, private call, and telephone interconnect.

Motorola Smartzone: The Motorola Smartzone system interconnects many trunked radio sites to better manage system resources and provide interconnect between these sites. The main advantage of Smartzone is to let users move across the state with the system registering their unit at each new trunking site without any manual operation being required by the user.

Mobile Data: Mobile data will allow KDOT, KHP, or EMS units equipped with the proper equipment, the ability to download files or request information with a data terminal or computer while in their vehicles. Mobile data will also allow GPS data to be updated at faster intervals without interference to voice traffic.

Social Impacts

The social trend with the most potential impact on the transportation system is the trend towards making all decisions, including transportation decisions, based on a community vision. This concept requires the community to come together and jointly agree upon a vision of that community for the future that guides decision-making in all arenas. Transportation facilities at one time were intentionally routed through older neighborhoods as part of redevelopment plans due to low land costs, eliminating many minority and low-income neighborhoods in the process. At the time, this approach was applauded as a revitalization effort. More recently, concerns about social injustice have stopped this practice and have led to a more careful consideration of transportation decisions to insure that both positive and negative impacts of transportation facilities are more fairly distributed throughout the community.

Executive Order 12898 directed every federal agency to make environmental justice part of its mission by identifying and addressing the effects of all programs, policies, and activities on “minority populations and low-income populations.” The USDOT’s environmental justice initiatives accomplish this goal by involving the potentially affected public in developing transportation projects that fit harmoniously within their communities without sacrificing safety or mobility. The three fundamental environmental justice principles are to:

- Avoid, minimize, or mitigate disproportionately high and adverse effects on minority and low-income populations,
- Ensure full and fair participation by all potentially affected communities in the transportation decision-making process,
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

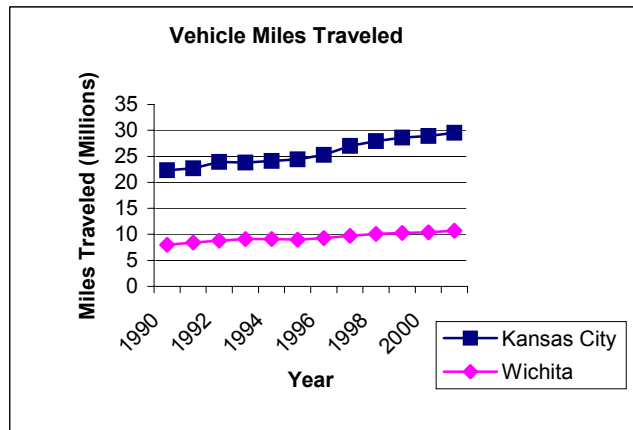
Environmental justice is not a new requirement. It is rooted in Title VI of the Civil Rights Act of 1964 and many other laws, regulations, and policies. At this time, there is not a well-defined means established at the federal level to measure benefits and

adverse effects, as it varies greatly by region. However, regardless of the method of analysis, if a good public involvement process is in place and decisions are made with Title VI in mind they will likely lead to a transportation system that meets the basic premises of environmental justice.

Currently, Kansas, among other DOTs, is continuing its current public involvement efforts while trying to determine the appropriate balance between public impacts, safety, design, costs and the overall benefit on a regional or state level. Part of this initiative includes demographic research in the discovery phase of projects to identify all affected parties. This will help KDOT to make sound knowledgeable transportation decisions and may reduce the opposition to potentially divisive projects.

Air Quality Standards

Under the Clean Air Act of 1990, the U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for various pollutants that affect the public's health and welfare. One of these pollutants, ground-level ozone, is a concern for two of the State's MPOs, Kansas City and Wichita. Ground-level ozone is the major component of smog. While ozone in the upper atmosphere occurs naturally and protects life on earth from harmful ultraviolet radiation, ozone at a ground level is a noxious pollutant. Ground-level ozone is not directly emitted, but is formed by the reaction of oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. On-road mobile sources comprise approximately 36% of ozone production in the Kansas City area, and include automobile emissions as well as diesel emissions from transport vehicles. This is a major concern because the number of vehicle miles traveled continues to rise at a steady rate. Although new cars are built to meet higher standards for emissions, increases in the number of vehicles on the road and miles traveled still lead to increased automobile emissions that are one source of NO_x and VOCs. Transportation options and land use policies greatly influence the level of auto-dependency in our cities. Opportunities for alternative modes of transportation can help to mitigate the impact of automobiles on the environment.



Based on Metropolitan Statistical Areas
Figure 6-1

In 1997, EPA revised the ozone NAAQS to a new 8-hour standard that is more stringent than the 1-hour standard. Following litigation at the Supreme Court level, the 8-hour standard was found to be constitutional, but EPA still has to develop a reasonable

approach for implementation. As of early 2002, EPA was soliciting public input on the implementation of the new 8-hour standard.

If a metropolitan area is determined to be in non-attainment of the NAAQS, it must develop a plan that shows how it will achieve attainment within ten years. Once the standard is met for three consecutive years and there is a maintenance plan in place the metro area may be redesignated as a Maintenance Area. After redesignation to a Maintenance Area, the city must maintain the standard for 20 years in order to achieve attainment status again.

Kansas City violated the standard in 1978 and became non-attainment. Subsequently in 1990, Kansas City was designated as a Maintenance Area. Violations then occurred again in 1995 and 1997. Since 1997, Kansas City has not had any additional violations. Currently, Wichita is in attainment of the 1-hour standard. The status of these MPOs could likely change however, with the implementation of the 8-hour standard. This could have serious impacts on transportation decisions in these urban areas. Depending on the outcome of EPA's Air Quality Boundaries, Sedgwick and Butler counties could be affected.

Areas that are non-attainment or maintenance have to submit State Implementation Plans (SIPs) that outline the actions that will be taken to reach attainment. Further, budgets for allowable levels of emissions must be set to ensure compliance with the standard. Based on the responsibilities charged to the MPOs, the most advantageous avenue to reduce emissions is to encourage a reduction in vehicle miles traveled. All in all, ensuring compliance with the NAAQS is a rigorous process and has implications on the availability of federal funds for transportation projects. Further, the Supreme Court recently held that the goals identified in the SIPs are binding and communities can be held legally responsible for meeting the goals.

Other Environmental Issues

Wetlands

Impacts to certain wetlands are regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. When transportation projects impact these wetlands, "404" permits must be applied for and obtained prior to construction activities. Large impacts require an Individual Permit and applications must go on public notice for 30 days giving various federal and state natural resource agencies the opportunity to comment. Avoidance and minimization statements are an important component of "404" permit applications. In a few short years permit conditions have become increasingly restrictive. Currently, mitigation is required for all wetland impacts. Mitigation ratios vary depending on the kind of wetland impacted and the distance of the replacement wetland from the impacted wetland. Mitigation sites require annual monitoring reports until they are functioning wetlands, and must remain as wetlands in perpetuity. Today wetlands are environmentally sensitive areas that are the focus of much attention. It is

expected that avoidance and minimization of impacts will play a larger role in permitting, and the costs of impacting wetlands will increase.

Water Runoff

Transportation contributes to water pollution through air pollution fallout and runoff from paved surfaces. Wetland destruction and other effects result from this type of pollution. Construction of large transportation projects reduces the amount of pervious ground available to capture rainwater. This is of particular concern in areas near streams or other waterways, which catch runoff that is not absorbed and filtrated through the soil. In addition, deicing materials are an issue for runoff. One way to limit the impacts of deicing materials (mainly salt) is through the addition of ITS technology to the state road crew fleet. Real-time knowledge of road conditions and historical operational information about the vehicle can help KDOT to allocate resources in a more efficient and effective manner while having the least intrusive impact on the environment.

Roadside Vegetation

Roadside management presents many challenges. Opinions regarding what the roadside should look like are often conflicting. Safety issues, erosion degradation, time spent on maintenance, aesthetics, and the protection of wildlife and native vegetation need to be balanced. Integrated Roadside Vegetation Management (IRVM) uses native vegetation and appropriate management techniques to create a roadside that is resistant to weeds and soil erosion, with little or no required maintenance. KDOT, in cooperation with the Audubon Society, is currently conducting 10 pilot projects in Kansas, along with a public education program. Six projects make up part of the Prairie Passage (a multi-state effort to highlight Great Plains vegetation), one is on a scenic byway, one is adjacent to the Konza Prairie, one is on US-400, and one is on K-10 between Lawrence and Olathe.

Erosion Control During Construction

Another environmental concern is erosion damage resulting from transportation construction sites. Erosion control is a part of every major grading project. Even so, erosion damage can occur at construction sites where large amounts of earth are left exposed during grading and not protected from the elements. Kansas often has severe and unexpected storms that have the ability to sweep away substantial amounts of valuable topsoil. A National Pollution Discharge Elimination System Permit is obtained from the Kansas Department of Health and Environment on all construction projects that disturb more than one acre. The major component of this process is KDOT's stormwater pollution prevention plan than outlines the measures to be employed to reduce erosion associated with our projects. When doing construction, it is important that KDOT and contractors be aware of these impacts and provide adequate barriers and protection to mitigate possible effects.

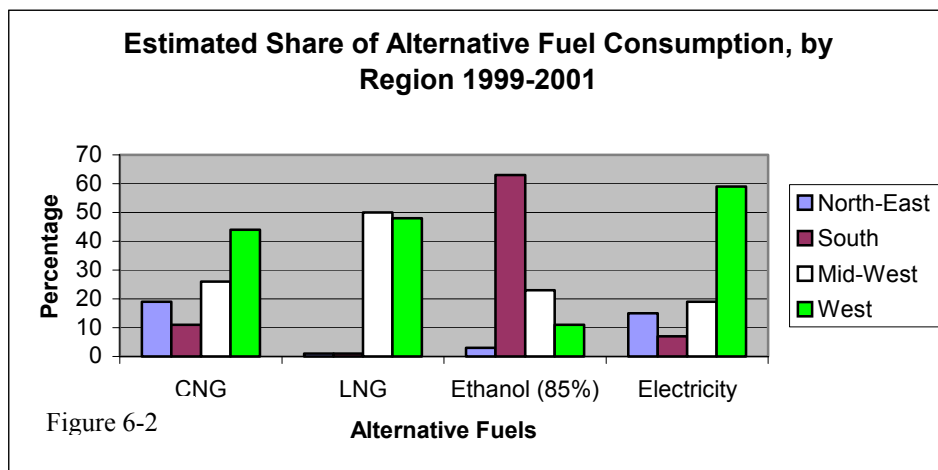
Advances in Alternative Fuels

Consumption of alternative fuels is likely to increase in the future. These fuels generally burn cleaner and have less impact on the environment. As environmental concerns continue to result in legislation with more strict requirements for clean air, the use of alternative fuels will increase. Another advantage of alternative fuels is that they can be produced from domestic supplies, which is politically appealing because it provides some level of energy independence. There is also growing support at the federal level about the need for a renewable-fuels standard, which would nearly triple ethanol and biodiesel use. At the same time innovation in the field of alternative fuels is rapidly growing. Experimentation with hydrogen power, fuel cells and electricity are producing prototypes that show promise. We are now at a critical juncture in the United States and decisions about the future of energy will need to be made.

The U.S. Department of Energy recognizes the following as alternative fuels: methanol and denatured ethanol, natural gas (compressed or liquefied), liquefied petroleum gas, hydrogen, coal-derived liquid fuels, fuels derived from biological materials, and electricity (including solar energy). Each of these fuels has its own characteristics and contributes in unique ways to the improvement of air quality. Another type of fuel is reformulated gasoline. However, while designed to burn cleaner than gasoline, it is not considered an alternative fuel. KDOT has committed to using biodiesel where available and when the cost difference is not more than 10 cents per gallon higher. About one-half of the trucks in KDOT District One (northeast Kansas) use biodiesel fuel.

In the near future, the integration of more electrical and hybrid electric vehicles into the market could have a significant effect on revenues for state DOTs. At the present time, manufacturers have not been able to mass-produce a low-cost electric vehicle that can perform at a level that would replace the standard automobile on a wide scale, but there is a great deal of research in the area, and it is likely that electric and hybrid electric cars will be improved to be truly competitive in the market.

In Kansas and the rest of the Midwest, the production and use of gasohol is good for agriculture by providing another



market for the corn produced by local farmers. The demand in the future for ethanol may increase due to some recent requirements by the Environmental Protection Agency. EPA has promulgated rules that phase out the use of methyl tertiary butyl ether (MTBE), as an oxygenate to improve the burning characteristics of gasoline in areas of the country that are in noncompliance for clean air requirements. MTBE is being phased out because of problems with it contaminating groundwater. Since ethanol is the only viable substitute to meet the oxygenate requirements at this time, the demand for ethanol in air quality noncompliance areas throughout the nation should increase substantially.

Compressed Natural Gas (CNG) also shows great promise for the future, especially for freight hauling. Kansas has large natural gas fields that can provide CNG for transportation. However, in order to make CNG viable investments in refueling stations will be necessary. This requires large amounts of capital and close coordination among cities, counties, states and the private market. Currently there are only a few such refueling stations around the country. A vast network similar to that for gasoline would need to be in place before CNG will compete evenly with gasoline. One strategy that is being considered is to concentrate CNG refueling stations along specific corridors. In that way, businesses making regular runs along the corridor could take advantage of the benefits of using CNG. Along certain trade corridors such as I-35 from Kansas City to Oklahoma City, it might be beneficial to explore future opportunities to coordinate in the provision of any such stations.²⁸

Transportation and Tourism

Tourism is a major factor in the Kansas economy. According to a Travel Industry Association of America report, travelers spent about \$3.4 billion dollars in Kansas in 1999 generating almost \$515 million dollars in tax revenue for federal, state, and local governments. Spending on auto transportation led all other travel expenditure categories with \$901 million. The tourism industry supports over 53,000 jobs statewide in a variety of sectors including hotels, airlines, restaurants, gas stations and others, resulting in \$821 million in wages and salaries. As such, it is important for the transportation system to accommodate the needs of tourists and the tourist industry. KDOT works closely with the Travel and Tourism Division of the Kansas Department of Commerce and Housing (KDOCH) in several areas related to tourism.

Three tourist and visitor centers have been built on the State Highway System at strategic locations to promote Kansas and its various attractions as visitors enter the State. These centers provide an excellent opportunity to educate the public about road and weather conditions as well as lodging, dining, and entertainment attractions. Kiosks may eventually be available at these sites with time sensitive, on-demand travel information for the traveling public. KDOT provides guide signs to various attractions throughout the State and produces the Official Transportation Map.

Kansas is in a very advantageous position due to its location at the crossroads of the nation. There is a great opportunity to capture through travelers at Kansas attractions as well as those travelers whose destination is within Kansas. One example of KDOT's commitment to encouraging tourism is the Scenic Byways Program. This program was developed in 1993 in close cooperation and coordination with the Kansas Department of Commerce and Housing, local governments, community groups, and private residents. The purpose of the program is to identify and designate scenic roads for the enjoyment of the traveling public. It strives to preserve the inherent beauty of these roads while providing opportunities for increased tourism and economic development. Since its creation, four scenic byways have been designated: the Flint Hills, Frontier Military, Post Rock, and Gypsum Hills Byways.

Another example of efforts to assist tourists, as well as Kansans, is the implementation of a 511 Traveler Information Service. KDOT's Bureau of Transportation Information is currently working on implementing the Kansas portion of the National 511 Traveler's Information Program. Similar to 411 and 911, 511 is a single three-digit telephone number that provides travel information to commuters, vacationers, commercial vehicle operators, and transit riders. Users would have access by telephone to real-time information on road surface and weather conditions, accidents, road closures, work zones, public transportation scheduling, and tourism. This information would be made available through ITS technologies that include voice recognition software, automatic vehicle location devices for transit fleets, road/weather information systems, and fiber optic communications.