American Association of State Highway and Transportation Officials

AASHTO

The Voice of Transportation

DRIVING INNOVATION FOR TRANSPORTATION

TIG

AASHTO TECHNOLOGY IMPLEMENTATION GROUP

CAST | CONSTRUCTION ANALYSIS SOFTWARE TOOLS

Maximizing Construction Efficiency While Minimizing Congestion

CAST serves as an important weapon in today's battles against declining budgets, increasing congestion, and aging infrastructure.

WHY CAST? WHY NOW?

CAST technology features software packages that provide managers and other decision-makers with information on construction options that minimize traffic congestion and maximize safe, efficient mobility during roadway construction or rehabilitation projects – and beyond.

Using CAST, transportation agencies and their consultants can model various construction scenarios to determine which best serve the needs of all stakeholders.

Although it is tempting to think of CAST as a gadget in an agency's "toolbox" – it is more akin to a decision process through which various, key scenarios can be envisioned, "tested" and weighed against each other in terms of safety, cost, and impact on customers – as well as variables such as construction materials, methods, staging, and life-cycle costs.

CAST also helps gather and organize data for Impacts Assessments and Traffic Management Plans required by FHWA's Work Zone Safety and Mobility Rule for federal-aid highway projects.

One significant benefit of CAST technology is that it often produces a relatively clear map of the thought process involved in choosing key construction options. This makes it a useful component of public information efforts, providing stakeholders with a clear view of the factors involved in agency decisions that impact highway users.

CAST offers agencies, industry, and customers a virtual opportunity to "try before they buy," painting an accurate picture of how specific choices in the course of construction or rehabilitation are likely to perform in practice. In short, CAST helps agencies maximize the efficiency of the intricate construction planning, design, and implementation process.

WHAT ARE MY OPTIONS?

Several popular software products are available in the marketplace to assist agencies with various aspects of construction analysis. Typical categories of options for these tools include:

- traffic simulation and analysis
- traffic management
- construction scheduling and cost analysis
- a combination of the above options.

Traffic Simulations:

These tools help evaluate the impact of a work zone on traffic at local or network levels. Three levels are available, depending on scope and complexity:

• Microscopic (Based on individual vehicles and detailed characteristics like grade, curvature, car following and lane changing theories. Often focused on immediate construction area.)

• Mesoscopic (Based on individual vehicles. Predicts at an aggregate level, using average speed on travel link.)

• Macroscopic (Based on flow, speed, and density of broader traffic sectors; generally network, corridor, or region-wide.)

Traffic Management Tools:

These tools aid in the modeling of:

• Traffic demand and handling

• Optimal signalization

• Analytical/deterministic factors (Usually yields basic level of service estimates regarding density, speed, and delay.)

• Sketch planning (Produces general, often "first-cut," travel demand and traffic operations estimates.)

• Schedule estimation

Construction Analysis Tools:

These tools aid in the design of an effective construction plan by assisting in:

• Stage planning

• Construction scheduling

• Cost analysis

CAST products vary by vendor and can be used alone, in sequence, or in tandem with one another. Functional integration of various CAST tools may be on the horizon, but at present, different tools are generally deployed for different needs or at different phases of the overall project.

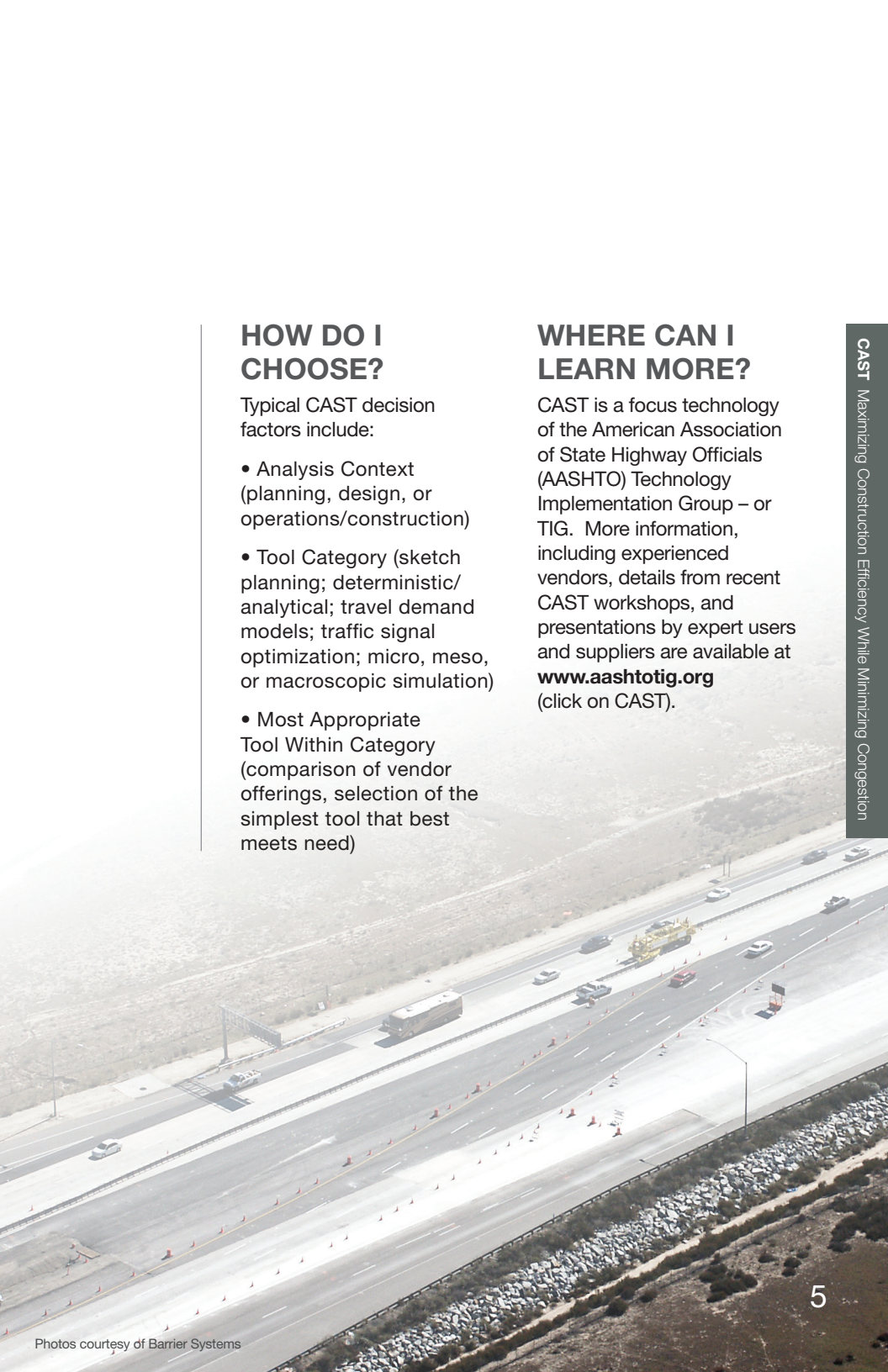
HOW DO I CHOOSE?

Typical CAST decision factors include:

- Analysis Context (planning, design, or operations/construction)
- Tool Category (sketch planning; deterministic/ analytical; travel demand models; traffic signal optimization; micro, meso, or macroscopic simulation)
- Most Appropriate Tool Within Category (comparison of vendor offerings, selection of the simplest tool that best meets need)

WHERE CAN I LEARN MORE?

CAST is a focus technology of the American Association of State Highway Officials (AASHTO) Technology Implementation Group – or TIG. More information, including experienced vendors, details from recent CAST workshops, and presentations by expert users and suppliers are available at **www.aashtotig.org** (click on CAST).



Photos courtesy of Barrier Systems

Construction Analysis Software Tools

Common Applications

PRODUCT	WORK ZONE TRAFFIC								CONSTRUCTION ANALYSIS		
	Analysis Type		Traffic Simulation Level			Traffic Management					
	Local Basis	Network Basis	Micro	Meso	Macro	User Delay Time/Cost	Detour Planning	Impact of Signs	Scheduling	Stage Planning	Cost Analysis
AIMSUN		□	□	□	□	□	□	□		□	
TRANSMODELER	□	□	□	□	□	□	□	□		□	
PARAMICS	□	□	□			□	□	□		□	
CORSIM		□	□			□	□	□		□	
IDAS	□	□			□	□					
FREQ	□	□			□	□				□	
CA4PRS	□				□	□			□	□	□
PRIMAVERA			N/A			N/A			□	□	□

CAST | CONSTRUCTION ANALYSIS SOFTWARE TOOLS

For additional CAST resources,
visit ***www.aashtotig.org***
and click on CAST.

ABOUT TIG

Dedicated to sharing high-payoff, market-ready technologies among transportation agencies across the United States, TIG promotes technological advancements in transportation, sponsors technology transfer efforts, and encourages implementation of those advancements.

For more information visit
www.aashtotig.org

CAST LEAD STATES TEAM

TIG's Lead States Team on Construction Analysis Software Tools includes DOT and FHWA representatives who can help you evaluate the use of the technology in your agency. Turn to team members for insight, expertise, and advice.

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