

# Technology

Roads Bridges Transit

Iowa State University  
Business and Engineering Extension

Local Transportation  
Information Center

# News

May 1990

## Safety Circuit Rider wins FHWA award

The Iowa Department of Transportation's "Safety Circuit Rider" program won the "Best Overall and Most Efficient Use of Resources" category in the Federal Highway Administration's Biennial Safety Award Competition. The nation-wide competition honored only eight programs.

The Safety Circuit Rider Program, through The Local Transportation Information Center at Iowa State University, brings safety information and training to people who may not otherwise be able to attend safety

**Continued on page 3**



Representatives from the various groups responsible for the award-winning Safety Circuit Rider program pose with the plaque presented by Regional FHWA Director Ken Jensen (back row, right). Representatives and their organizations are (front, left to right): Joyce Emery, DOT; Larry Stevens, Oskaloosa City Engineer; John Whited, DOT; Bill McCall, DOT; Hubert Willard, FHWA; Ed Finn, FHWA; and Ed Bigelow, The Center. Pictured in the back row are: Darrel Rensink, DOT; Lowell Richardson, DOT; Jack Latterell, FHWA; Carson Whitlow, Governor's Transportation Safety Board; Tom Maze, The Center; Harold Schiel, DOT; and Jensen.

### Notes

**A NEW FAX NUMBER** to contact The Local Transportation Information Center is now available. Use the number 515/294-8216 to fax requests for library material or information. Address faxes to The Local Transportation Information Center or Jan Graham.

**A LIST OF CDL LICENSING** workshops and training materials is being collected by The Center. Call 294-8082 for a list of training resources. Or, if you've found a CDL training program yourself, please call so we can update our lists.

### Inside pages

**2** Railroad crossing accidents frequently lead to lawsuits. "Tort Liability" discusses what can be done to effectively warn motorists of upcoming crossings.

**5** Des Moines City Engineer Harold Smith has been elected national president of the American Public Works Association.

**6** "Tips From The Field" shows how a lumber storage rack helps keep building materials organized.

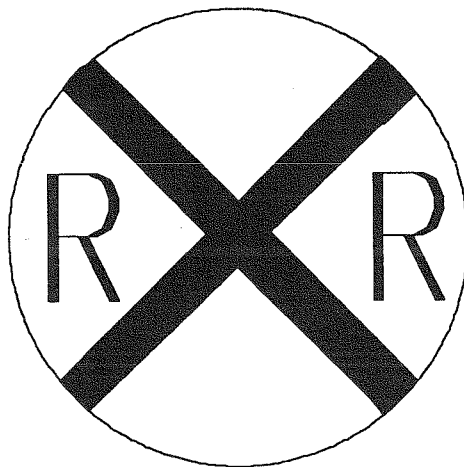
# Crossing accidents invite lawsuits

Accidents at railway-highway grade crossings tend to be quite serious in terms of personal injuries and lost lives. They also tend to be ripe pickings for attorneys representing plaintiffs in the ensuing lawsuits. Usually, there are multiple defendants with deep pockets, a railroad company and one or more highway agencies. Of 17 such cases with which the writer has been involved, only two were tried (two are still pending). The others were settled without trial, generally with a substantial payment to the plaintiff. Although the defendant won both of the cases that were tried, these cases offer no particular insight into the engineering factors that are decisive in adjudicating lawsuits resulting from grade crossing accidents.

Most grade crossing cases involve an alleged misuse of traffic control devices. In 13 of the cases mentioned above, only passive devices were present (crossbucks and railroad advance warning signs). Flashing light signals were present at two crossings and two crossings had stop signs. No matter what controls were present, a plaintiff will allege that there should have been a higher level of protection, gates if flashing light signals were present, and signals if only signs were in place.

## Tort Liability

By R. L. Carstens  
Professor Emeritus of  
Civil Engineering



The crossbuck is defined in the current Manual On Uniform Traffic Control Devices (MUTCD) as a regulatory sign. Its intended role is that of a yield sign directing motorists to yield to trains if a crossing cannot be made safely. Testimony by plaintiffs' experts in several lawsuits has attempted to show that the crossbuck was a warning sign (as in versions of the MUTCD prior to

1971) rather than a regulatory sign. Crossbucks should always be present. They are generally installed by the railroad company. Use of the railroad advance warning sign is the responsibility of a highway agency and is almost always mandatory.

Pavement markings should be used on heavily traveled roads with prevailing speeds of 40 mph or more. Failure to use pavement markings is not usually fatal to the defense of an accident case. However, non-use of both crossbucks and railroad advance warning signs will almost surely place the defendant in an indefensible position.

Both railroads and highway agencies are vulnerable to lawsuits if they have permitted significant vegetative growth within their rights-of-way. Failure to clear such growth causes sight distance limitations that may contribute to accident causation. Table 8-4 in the Traffic Control Devices Handbook (TCDH) gives the sight distance "requirements" for various vehicle and train speeds. Of the 17 lawsuits referred to above, sight distances meeting the criteria of Table 8-4 were present in all four quadrants at only one site. (That case was settled without trial when the plaintiff accepted a six-figure set-

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Program Manager — Tom Maze; Assistant Program Manager — Jan Graham; Safety Circuit Rider — Ed Bigelow; Communication Specialist — Larry Mendenhall; Program Coordinator — John Moody; Office Assistant — Cindy Koester

The preparation of this newsletter was financed through the Technology Transfer (T<sup>2</sup>) Program. The T<sup>2</sup> Program is a nationwide effort financed jointly by the Federal Highway Administration and the Iowa Department of Transportation. Its purpose is to translate into understandable terms the latest state-of-the-art technologies in the areas of roads, bridges, and public transportation.

The opinions, findings, or recommendations expressed here are those of the Local Transportation Information Center and do not necessarily reflect the views of the Federal Highway Administration or the Iowa Department of Transportation.



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# Safety program wins award continued from page 1

workshops. Ed Bigelow, the program's Circuit Rider, presents the traffic safety programs in places such as breakrooms, courthouses, and worksheds where local government employees can easily attend them.

"We, of course, are very, very pleased with the award because it emphasizes the importance that we give to safety," Iowa Department of Transportation Director Darrel Rensink said. "It also emphasizes the strength of our program, which is going out and making sure that our philosophy of safety gets into the territory of people who can benefit from it."

Local agencies can use Bigelow as a safety resource. He can help an agency determine what safety training is needed and provides information on other available safety programs. The program is just beginning its second year.

"The Safety Circuit Rider is an excellent example of how ISU and the Extension Service can work with other branches of state government to have a positive impact on Iowa," Local Transportation Information Center Program Manager Tom Maze said. "The Circuit Rider is a conduit for information to organizations and individuals that may not have access to safety information unless it's delivered in their own community. I am sure Ed is having a positive impact on safety and I am glad The Center is used as a delivery mechanism for local safety training."

Under the direction of the DOT and FHWA, Bigelow is developing three safety programs. The first trains local officials in interpreting IDOT's accident location report system and

identifying countermeasures to remedy high accident locations. That program, A.L.A.S. (Accident Location and Analysis System), has already been presented for 30 cities and counties. The other programs, flagger instruction and sign inventory and analysis, are still being developed. The flagger instructional program will be supported by videotapes, which are in production at ISU and should be ready by fall.

"To me, the award meant the Circuit Rider concept was sound," Bigelow said. "The feedback from the meetings I've already held has been enthusiastic. Now I need to schedule meetings throughout Iowa."

When FHWA Administrator Thomas D. Larson notified Rensink of the award he also commended "the cooperation and coordination" among the many agencies involved in beginning the program.

"It was certainly nice to hear a comment like that from Mr. Larson, who is director of the Federal Highway Administration," Rensink said. "I feel we work well, not only amongst all of our own departments, but with other agencies as well."

The other award winners were: the Virginia Department of Transportation for its work zone video and brochure; the Arizona Department of Transportation for implementing effective clear zone improvements; the Colorado Department of Highways for a maintenance video and incentive program; the Pennsylvania Department of Transportation for its highway safety corridor program; the Yuma County Public Works Department for its curved approach guard-rail; the Western Federal Lands Highway Division for safety enhancements on the Whitefish-Eureka Highway; and the Washington State Department of Transportation for its utility control zone policy and video.

## Tort Liability continued from page 2

tlement offer from the three defendants.) Expert testimony in this regard usually involves a dispute between the parties as to whether these are sight distance requirements, as stated in the TCDH, or merely recommendations. Juries in the cases resolved by trials have apparently considered them as recommendations, but there clearly is no assurance that this always would be the case.

To summarize the recommendations relating to railway-highway grade crossings, use the highest level of traffic control that can be justified based upon an engineering study and the availability of funding. Also, keep rights-of-way clear of weeds, brush, and trees that will limit sight distances on the approaches to a crossing. Otherwise, you will help contribute to the ripe pickings of a plaintiff's attorney when an accident occurs at one of your crossings.

# Hardware causes disk problems

Different types of microcomputers have found their way into our offices in the last couple of years. These computers range from an Apple II that Ken Brewer (another transportation engineering professor) just remorsefully gave up for a new Macintosh to an IBM-compatible machine with a high-speed processor used by Technology News Editor Larry Mendenhall. A new disk drive on Ken's Macintosh allows all our machines to read IBM-compatible disks. This allows us all to exchange files on floppy disks, or so I thought.

Occasionally, when passing files on floppy disks from one machine to another, we would get an error message that told us that the machine could not read the file. This also made the entire diskette and all the files on it unreadable. The only way we could use the disk in the future, without using a recovery utility, was to reformat the disk. A step which erases all the disk's data.

Our difficulty with floppy disks turned into a crisis at one of our Iowa State Pavement Management System workshops. Each workshop participant was to receive a formatted disk with a copy of the PMS program on it. At the workshop, however, only a few computers read the disks we had prepared. It took a staff member about an hour to reformat and copy the program onto every disk.

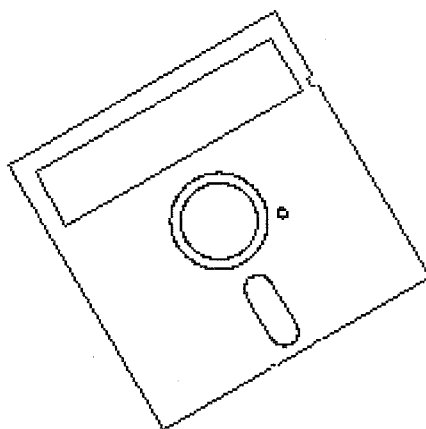
My first inclination was to blame the problem on the floppy disks. I found upon further examination, however, that it was our fault. We did not recognize that disk drives have not remained totally compatible with each generation of computer.

Each floppy disk (whether 5-1/4 inch or 3-1/2 inch) is divided into tracks.

## Microtechnology

By Tom Maze  
Program Manager

Tracks are concentric bands on the disk containing data stored in magnetic media. Original 5-1/4 inch disks had 40 tracks on a side or 48 tracks per inch (TPI). Early IBM microcomputer operating systems divided each track into eight sectors. Later operating systems divided each track into nine sectors. Each sector is a subdivision of a track and can store 512 bytes of data. The sectors of each track are subdivided by magnetic flags.



A double-sided, double-density floppy disk can hold about 180,000 bytes of data on each side (40 tracks x 9 sectors x 512 bytes = 184,320 bytes of storage). Counting both sides, the disk can hold about 360,000 bytes of data.

Some of the computers in our office have newer, high density drives. These drives can store up to 1.2

million bytes on a 5-1/4 inch disk (1.4 million on a 3-1/2 inch disk) provided that a high density disk is being used. High density disks have a special magnetic coating on their surface and have twice as many tracks (80 tracks and 96 TPI) which are divided into 15 sectors (2 sides x 80 tracks x 15 sectors x 512 bytes = 1,228,800 bytes of storage). Because the track density is higher, the read/write head of the disk drive is narrower.

In our office, we have microcomputers with both high and low density disk drives. Fortunately, the higher density drive machines can read lower density disks. However, the two systems are not always compatible.

For example, when you write data on a low density disk with a low density drive and write over the disk with a high density drive, the latter drive's smaller head may not completely erase the old data. Later, when the low density drive again reads the same sector, the head may pickup both portions, resulting in a reading error.

My secretary has a machine with a low density drive and my machine has a high density drive. It is inevitable that we will continue to suffer from the occasional incompatibility of our equipment. How do I plan to minimize the disruption of occasional incompatibility? First, all information exchanged on floppy disks is backed-up on the sender's internal hard disk or another floppy disk. Second, formatting and copying of data onto disks is done on a low density drive unless that we know that the disk will be used only on a high density machine.

# Smith serves as APWA president

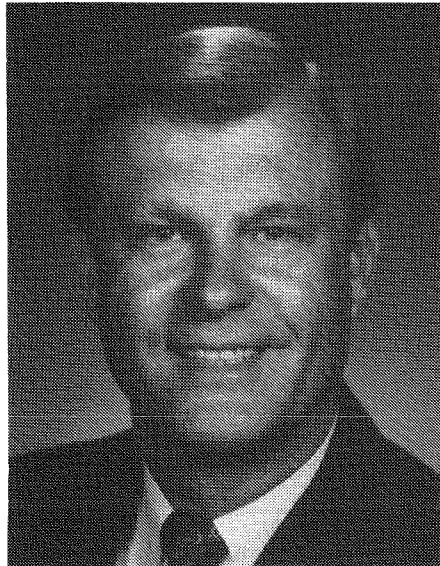
As the first Iowan elected president of the American Public Works Association, Des Moines City Engineer Harold Smith finds himself presiding over an organization and a profession in transition.

"It's been a real interesting job, because it's a transitional period for the APWA," Smith said. "As for public works in general, we're often taken for granted. People have lost sight of the critical nature of services provided by public works departments. Unfortunately it only seems to come to light when you have an earthquake or a Hurricane Hugo."

Smith is serving a one-year term that began in September. He served a year as vice president before becoming president and will remain on the association executive committee as past president once his term is over.

APWA members elected Smith president after a committee placed his name in nomination. Smith has been active in the APWA for some 25 years in a number of leadership positions including two three-year terms as Region 6 director. Region 6 consists of the province of Manitoba, North and South Dakota, Minnesota, Iowa, Kansas, Missouri, and the Kansas City Metropolitan chapters. The usual qualifications for APWA president have been long service and having held leadership positions.

The APWA organization is in transition because its executive director of 31 years has retired. Smith said APWA is taking the opportunity to examine what the organization needs to do to keep it and its members up to date in the nineties and to improve on the services it provides to its membership.



**Harold Smith**

"We have over 28,000 members and as time and issues have evolved we've grown into a complex organization," Smith said. "In the seventies and eighties we faced a wide range of issues dealing with infrastructure. In the nineties we are going to see more interest in environmental issues, such as air and water quality and waste management. Times change and we have to change with them."

Three priorities face APWA in the nineties, according to Smith. The first is to increase awareness of the critical needs public works departments have and the quality of life services that they provide. The second is to encourage young people to pursue public works careers. The third is to improve information services for its members, including more educational programs to enhance public works administrators' management abilities.

"We have been trying to get the funds to do maintenance and

rehabilitation, but now the political focus has changed," Smith said. "The public is generally more concerned with social and environmental problems. First, there are issues like drug abuse, crime, child care, and the homeless. Secondly, there are concerns about waste management, waste reduction, waste water treatment, and other environmental issues. Our traditional maintenance concerns are not among those issues. Public works administrators have to do a better job of selling our needs to support construction and maintenance of our infrastructure systems and the vital services that enhance our quality of life."

Smith believes the APWA can do that in several ways. The first is to do more testifying with factual information in front of government agencies. Smith has already appeared before Congress. He will make more appearances in Washington as well as at the state legislature in the future. He also expects the APWA to "do a better job in developing coalitions" with other groups having similar interests and goals.

"Education and informational services to our members will be particularly important to the APWA in the next decade," Smith said. "We need to enhance and reach out with our educational programs. There is currently a critical shortage of engineer graduates and a lack of females in public works as opposed to other professions. We need to gear some programs toward the grade school level. Children this age already have an interest in environmental activities and we need to see if we can cultivate their interest enough to major in engineering in college and have them take an interest in public works."

**Continued on page 6**

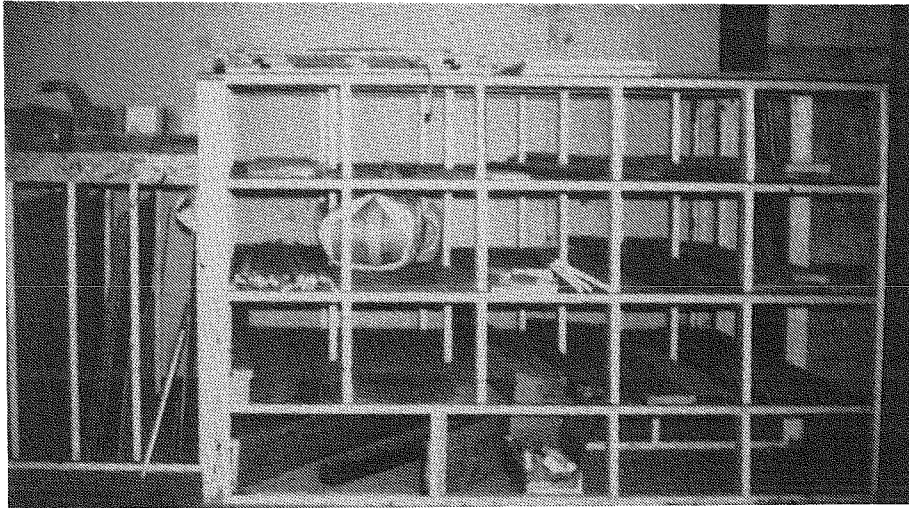
## Tips From The Field

# Rack eliminates lumber piles

Any public works department has a lot of miscellaneous building material on hand. But after a few years storing these materials so that they can be easily pulled from the pile and used becomes a problem.

A storage shelf can help organize a pile of lumber so that any size that

may be needed is easily accessible. Willard Wray, director of public works for the city of Clive, designed the storage wrack as shown in the photo to help keep his pile of building materials manageable.



**A rack such as this one by the City of Clive eliminates unsightly and frustrating lumber piles.**

Each storage area in the shelf is two-foot square. Each square is assigned its own size of lumber. The bottom level can be designed to hold boards up to 14-feet long. The rack is open at both sides to slide lumber in.

A section to hold flat building materials, such as plywood, is attached to the side. Styrofoam and sheet rock are stored flat on top of the rack.

Also on top is a bin with a number of plastic trays with handles. Various sizes of nails, screws, and bolts are stored in their own tray,

making it easy to tell that enough materials are available.

For more information contact Willard Wray at 515/223-6230.

## Smith serves continued from page 5

Improving services to its members include more programs for the employee doing the work on the street as well improving APWA's other programs and publications.

"We've got to find ways to get information through to all levels of public works people," Smith said. "Twenty years ago we had conferences for just about everyone. But budget restrictions have limited attendance except for administrative personnel. I'd like us to do summary publications that give members some information along with references of

other agencies which may already be doing an excellent job. Technology transfer is not timely and must be improved on by other means such as video presentations and computer information interlinks."

Besides his duties as city engineer and APWA president, Smith is also director of the Des Moines Metropolitan Waste Water Management system. The waste water system consists of 12 governmental agencies and has been Smith's "career project."

Smith and Des Moines Public Works Director John Bellizzi instruct a popular workshop for The Local Transportation Information Center called Portland Cement Concrete and Asphaltic Cement Pavement Maintenance.

"T2 organizations, like The Center, have grown nationwide," Smith said. "The technology transfer is one of the nice things about T<sup>2</sup> because its courses are directed toward small community working personnel. It's something which we need to do more of."

## For More Information

The video tapes and publications listed in this column are available on a loan basis by contacting **John H. Moody, Iowa State University, Local Transportation Information Center, 194 Town Engineering, Ames, Iowa 50011 515/294-9481.**

**“Selected Bibliography of Hydraulic and Hydrologic Subjects” Hydraulic Engineering Circular No. 1** This 54-page bibliography is compiled to assist highway engineers in finding current and authoritative publications on hydraulic and hydrologic subjects. Many of the papers and publications listed are research reports and do not contain design methods in a form readily usable by highway engineers. These papers, however, give the designer a technical background in subjects of hydraulics and hydrology. Limited supply. **Request index #135.**

**“Road Surface’s Reflectance Influences Lighting Design”** This five-page report by Richard E. Stark was reprinted for the Portland Cement Association from “Lighting Design and Applications,” published in April 1986. Narrative and tables in this

brief report point out the importance of road surface material selections in obtaining acceptable performance from a roadway lighting system. **Request index #203.**

**“How DOTs Train and Motivate Bridge Crews”** This is an article from the March 1988 issue of “Better Roads” magazine and refers to various approaches to the utilization of manpower, equipment, and materials in carrying out a bridge maintenance program in various states. **Request index #503.**

**“Pothole Repair in Asphalt Concrete Pavement”** This tape takes the viewer, step by step, through pothole repair procedure. It deals with placing traffic control devices, marking defective areas, cutting out defective material, clearing the hole, and applying the tack coat, placing the mix, compacting the mix in the hole, and cleaning up the work site. The tape may be accompanied by a printed supplement prepared by Reta G. “Tinka” Jones of the Louisiana Transportation Research Center. **Running time: 13 minutes. Request index #65V.**

**“Crack Repair in Asphalt Pavement”** This tape, produced by Roy Jorgenson and Associates for the International Road Federation, details the various types and sizes of cracks an inspector should watch for. It also covers the tools, equipment, and materials required for an acceptable repair job. The tape is accompanied by a printed, three-page supplement prepared by Reta G. “Tinka” Jones of the Louisiana Transportation Research Center. **Running time: 11 minutes, 48 seconds. Request index #67V.**

**“Base and Sub-base Repair”** This tape deals with the symptoms evident in base and sub-base failure and explains the tools, equipment, and materials need to make adequate repairs. This is followed by a step-by-step repair procedure. The tape is accompanied by a printed, five-page supplement prepared by Reta G. “Tinka” Jones of the Louisiana Transportation Research Center. **Running time: 16 minutes, 4 seconds. Request index #69V.**

### Publication order form

To obtain the materials listed from The Center, return this form to The Local Transportation Information Center, Iowa State University, Business and Engineering Extension, 194 Town Engineering, Ames, IA, 50011.

	Title	Index No.	No. of Copies
Name _____	_____	_____	_____
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City/state/zip _____	_____	_____	_____
Phone ( ) _____	_____	_____	_____

Please send a complete listing of all publications from your office.

Please send a complete listing of all audio visual materials available

# Conference Calendar

**14th Annual Spring Iowa Traffic Control and Safety Conference, May 17, Scheman Building, ISU, Ames** This conference promotes safer and more efficient transportation on the streets and highways of Iowa. It's sponsored by the Iowa Traffic Control and Safety Association, ISU Civil and Construction Engineering Department, and ISU Business and Engineering Extension. Contact Jo Sedore 515/294-4817.

**8th Equipment Management Workshop, Sponsored by the Transportation Research Board in cooperation with IDOT and ISU, May 28-31, Marriott hotel, Des Moines** A national conference on the latest equipment management techniques and on present and future equipment technology. Contact Angelia Arrington 202/334-2934.

**The 1990 Community Transportation Expo, June 26-29, Phoenix, Arizona** Contact CTAA 800/527-8279.

**Getting Along With Your Microcomputer, June 5, Iowa Western Community College, Council Bluffs; June 7, Carver Hall, ISU, Ames** This workshop introduces IBM-compatible microcomputer technology, the MS-DOS'm operating system, and the use of spread sheets in typical local government functions. The workshop is taught in a computer laboratory to allow hands-on participation. Contact Jo Sedore 515/294-4817.

**Iowa Public Transit Association Annual Meeting, June 5-8, Hilton Inn, Sioux City** Contact IPTA, 515/246-1888.

**Automated Pavement Distress Data Collection Equipment Seminar, June 12-15, Scheman Building, ISU, Ames** Demonstrates latest pavement distress collection technology and the use of distress data for better management of pavements. Contact Jo Sedore 515/294-4817.

**ITE District 4 24th Annual Meeting, June 26-28, Minneapolis, Minnesota** Contact Charlie Wold, 612/777-5989.

**Sixth Maintenance Management Workshop, July 22-26** This is a national conference presented by TRB on the state-of-the-art of highway maintenance management. Contact Angelia Arrington 202/334-2934.

**Motor Grader Operator Training Programs being scheduled for summer 1990.** Call 515/294-8082 for more information.

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**And justice for all**  
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