AASHTO/AGC/ARTBA Joint Committee
Subcommittee on New Highway Materials and Technologies
Task Force 13
Standardization of Details for Bridge and Road Hardware
Meeting Minutes – September 23 & 24, 2002
Westport, St. Louis, Missouri

Chairman **Arthur Dinitz** greeted the assembled members with the news that this would be his last meeting as Chairman. The Task Force 13 (TF13) Nominating Committee nominated, and the TF13 Executive Board elected **Pat Collins** and **John Durkos** as Co-Chairs. **Dinitz** praised **Collins** and **Durkos** as hard-working and knowledgeable TF13 members who will be more than adequate to the task. **Dinitz** will remain as Chairman Emeritus of TF13 and will continue to represent us as a Co-Chair of the parent Joint Committee. He also recognized the long-standing participation of states such as Wyoming, Louisiana, and Texas that have sent very active members to the Task Force.

Dinitz noted that the parent Joint Committee recently put out a resolution on the highway legislation reauthorization, but it failed to mention safety. This points out how TF13 members must be on the alert to promote highway and roadside safety at every opportunity. He also explained the TF13 connection with the Joint Committee, and the structure of TF13 itself being divided into seven active subcommittees. TF13 Secretary **Nick Artimovich** then briefly recapped the activities of those subcommittees from the minutes of the Spring 2002 meeting held in Seattle, Washington.

Dinitz noted that funding continues to be a significant problem for TF13 efforts, especially our publications. One snag is the fact that many highway safety products are proprietary, and the states are loath to devote public moneys to projects and publications that contain such hardware. Industry members can work toward overcoming this perception by helping to foot the bill for TF13 efforts, leaving a smaller portion of the overall costs to be borne by the states.

Subcommittee Meetings

Subcommittee # 1 Publications **Nancy Berry**

Berry led off the subcommittee breakout sessions with a presentation to the TF13 as a whole, as all members are participating in subcommittees that are preparing standardization documents. She re-capped the survey she took over the last year, noting that TF13 publications do not generate much revenue for AASHTO. Most states require anywhere from 1 to 25 copies, and prefer them in electronic format, in dual English/Metric units, and with drawings in Microstation format so they can be cut and pasted directly into State standards manuals. **Dinitz** noted that former AASHTO director Frank Francois was supportive of technology while John Horsley was more interested in the management side. Horsley has since hired ex-FHWA Executive Director Tony Kane as AASHTO's head of technology. Kane and Ken Kobetsky will get more involved in AASHTO committees, task forces, etc., and **Dinitz** is more optimistic that this may lead to more AASHTO funding of TF13 activities.

Berry asked "what can TF13 do to help our own cause?" and **Dinitz** answered that the subcommittees need to develop budgets to help justify spending AASHTO funds. **Berry** noted FHWA's offer to host the TF13 web site, and **Artimovich** discussed the web development contract that may be used to post material for TF13 for the near future. **Collins** noted that part of our budget should include expected revenue generated from sale of publications.

Dinitz suggested that TF13 offer a dual publication format: they should be available for download from the Internet or for direct purchase from AASHTO. There was some discussion over TF13 drawings being downloaded from the Internet as that could lead to designers altering the drawings without permission. **Dick Albin** stated that any and all TF13 drawings are to be used by the designer at his/her own risk whether they are hard copies or electronic versions. **Hossein Ghara** noted that Integraph erases the drawing's "seal" when changes are made. **Durkos** indicated that the new versions of Integraph is more difficult to translate to other formats, but **Dean Alberson** said that there are several vendors of translation software that will be competing to create the best and most efficient versions for users.

John La Turner took this opportunity to demonstrate his TF13 draft website design. It includes pages for Task Force Organization, Publications, Subcommittees, News/Bulletins, Member Resources, and Links. FHWA is looking into the possibility of hosting this site until it can be incorporated into AASHTO's or the Joint Committee's site.

Dinitz took advantage of slack in the schedule and showed pictures of historic and modern bridges, and of emerging roadside safety features from his trip to China.

Subcommittee #2 Barrier Hardware **John Durkos**

Durkos began by reminding all members of "Put the Brakes on Fatalities Day" to be noted on October 10. He then reviewed the current problem statement and other potential areas of work, for example, the inconsistency between various AASHTO documents regarding the 42" vs. 54" height of pedestrian and bicycle railings. **Albin** has already put together a problem statement on bike rail heights. Another topic of current interest is Anti-Terrorism barriers where security is more of a concern to the owners than crashworthiness as we know it. The thrie-beam bullnose and wood rails were also discussed.

The subcommittee had prepared a budget of $115,000 for updating the barrier rail hardware book. Mac Ray had addressed the need for updating this book and, indeed, proposed a method for doing so in his final report. **Albin** has summarized that information, which is available for members. Some drawings are ready to have changes made and sent to the contractor. Although volunteer progress is being made, a contractor will be needed to prepare the final document.

Subcommittee # 3 Bridge Railings and Transitions - **Mark Bloschock**

The Subcommittee is working towards a document which will capture all crash tested bridge railings and transition designs - as FHWA is working on a similar document dealing with bridge rails only, there is a need to coordinate efforts so as to reduce duplication. The subcommittee is also looking for funding to help carry their work further. There is a question as to whether private money may be used to supplement the pooled fund effort by the states.

New areas of standardization for this subcommittee include pedestrian - bicycle railings, bridge rail expansion / construction joint hardware, and anchors for safety shapes added to the edge of a deck.

Subcommittee #4 Sign and Luminaire Supports **Mike Stenko & Greg Frederick**

Stenko led off with a discussion of the progress on updating the Guide to Small Sign Support Hardware. **Artimovich** mailed Mac Ray's original diskettes to **Lance Bullard**. **Stenko** asked for suggestions on handling products that are no longer available. If all pages from the 1997 edition are sent to the manufacturers, they will be responsible for additions or deletions to their product line. **Artimovich** will contact all those who have received acceptance letters subsequent to publishing of the 1997 edition. There was also a significant discussion over just how metric and English units should be handled, especially with regards to fastener hardware (nuts and bolts do not have English/metric equivalents if they are critical breakaway components - to provide metric units for a US Customary bolt is misleading and could result in a contractor selecting a larger diameter bolt that will not function as necessary.)

Frederick reported that Wyoming has written the scope for the pooled fund effort to revise the luminaire support guide. Five state representatives are advising the panel, and industry members will be asked to review it.

Subcommittee # 6 Work Zone Hardware **Hossein Ghara & Barry Stephens.**

Various members of the Subcommittee reviewed the National Work Zone Safety Information Clearinghouse and discussed various aspects of the site. The Subcommittee's feedback will be provided to Dr. Ullman for his use in improving the site. The Subcommittee also discussed potential research topics:

1. Crashworthiness / shielding of Work Zone Category IV Devices. Are these trailer-mounted arrow panels and variable message signs being hit with a frequency and severity that is causing a problem in work zones? FHWA needs this information before rulemaking that would force redesign of work zones to add barriers or redesign of trailers to make them crashworthy.

2. Speed limits in work zones: What is the relative safety of reducing speeds in work zones? Is it safer to design to detours and safety hardware to accommodate the prevailing traffic speed, or to force traffic to slow so they can negotiate the area more safely?

3. Temporary Concrete Barriers on the Edge of Bridge Decks: This is similar to the need voiced by the Bridge Railings and Transitions Subcommittee.

Subcommittee # 7 Certification of Test Facilities **Ron Faller**

Faller showed the latest results of inter-laboratory comparisons. He also noted that new data sets were recently sent out for analysis. Certain "ground rules" were established for these data sets so that all analyses would have the same starting points. He also discussed Category II work zone devices and what level of certification would be required from labs that only conduct these tests. It was noted that the complete certification process is appropriate for these labs, except that their statement of services would dictate what procedures would need to be included in the review.

Subcommittee # 8 Rail-Highway Crossing Hardware **Dean Alberson & Rick Mauer**

Stenko – Brought list of RR associations and RR publications. **Alberson** will send Mike the work document that we has thus far. **Mauer** is going to verify all of the State contacts via an email. He will ask for web addresses as well as any of the address info that is missing.

Dean is trying to "put a stake though the heart of this committee" and deliver a product for publication and end the committee by next meeting.

Don Johnson wants **Alberson** to contact TRB re Don Ivies Utility Pole Issues

Problem Statement – motorist attempts to go around RR gates and various curbing systems have been employed to stop action. Is there a place for standardization of these types of devices?

2001 RR Fatalities TX 29 accidents 31
2000 RR Fatalities TX 51 accidents 42
Nationwide 425 deaths RR trespassing deaths on the rise.

Special Subcommittee on Marketing

The Task Force is pleased with the efforts of this subcommittee, as more participation has been generated from industry, State DOTs, and testing laboratories than five years ago. Bob Kardian had prepared a strategic plan to improve State DOT participation - much has been done in line with that plan and there is more to go. The web site will be an excellent marketing tool and will be used for posting minutes and notice of upcoming meetings. Because this is not just a group dealing with safety devices TF13 can be more involved where standardization will be beneficial. For example, we should encourage involvement with maintenance people and promote upgrading of damaged features rather than obsolete practices of replacing - in - kind.

Special Subcommittee on New Areas of Standardization

No new suggestions, but members are asked to suggest new areas where they find standardization would make life easier, safer, or more profitable.

Executive Committee Meeting Monday, September 23

In attendance were **Dinitz, Artimovich, Stephens, Collins, Durkos, Cota, Berry, Little, Ghara, Leahy, Stenko, Frederick, Bloschock, Mauer, Faller, Albin, Bullard, Collins, and Artar.**

Dinitz thanked all Executive Board members present and congratulated them on their subcommittee efforts. As this was his last meeting as Chairman, he was pleased that TF13 is going forward with two terrific individuals as Co-chairs. **Dinitz** will remain a member of TF13 Executive Committee as "Chairman Emeritus" as he is also Co-chair of the parent AASHTO/AGC/ARTBA Joint committee. He also noted that the Executive Committee will be listed with the parent committee as the Task Force members, however all on the mailing list may consider themselves members of Task Force 13. **Artimovich** will provide a current list of ExecBoard members to the Joint Committee Secretary, and provide an electronic file of all members to each ExecBoard member.

Little asked that a replacement be found for him as co-chair of the Lab Certification Subcommittee. Since it is desirable that one co-chair of each subcommittee be from a state, and one from industry (in this case, a crash test house) Rich Peter of Caltrans was suggested. Harry Taylor of FHWA, who has contacts with international testing labs, and John LaTurner, who has promoted Certification of his lab, E-Tech, were also suggested.

Bullard expressed appreciation to **Little** for TFRS participation, and asked what could TF13 do differently to improve our products and services? **Little** replied that TFRS members are very interested in TF13 but cannot participate as fully as they would like because of funding constraints. They understand TF13 and the knowledge of our members, our committee efforts, and our products are very useful. Where do we have common issues, and where do we not overlap? TFRS is used to a more structured setting to all discussions, whereas TF13 open/informal interactions do not appear as focused. The opportunity for the State people to mix with academe and industry participants is invaluable.

Little continued, and noted that AASHTO is finally learning that they are the prime source of research funding to replace the monies that were formerly available through FHWA. **Collins** noted that the call to provide an annual budget is cause for hope. If we show AASHTO what we need in order to function as an effective Joint Committee Task Force and produce our publications. **Bloschock** will look into putting our draft documents on the web site. AASHTO will be informed, of course, but we hope that they will not object. The AASHTO imprimatur is still needed for supporting the use of the documents and to justify state DOT participation in TF13.

Dinitz reported that ARTBA is pushing for a doubling of funding for highway research and development. He also proposed that the Joint Committee provide $2 million annually for the work of the Task Forces. **Little** noted that all states benefit from the efforts of TF13 through reduced costs for hardware that is standardized across many states. TF13 publications do their work at the state standards or design officials, while documents like TFRS's Roadside Design Guide go down to the practitioner level.

A general discussion of future TF13 meeting sites commenced with **Dinitz's** expression of interest in Jackson Hole for the Fall 2003 joint meeting. New Orleans and Lincoln were also bandied about, with the express concern that the location of that meeting is the prerogative of TFRS, and that TF13 will be pleased to co-locate wherever the AASHTO people choose. A strong potential site for the Spring 2003 site is San Antonio, Texas, as Southwest Research Institute has expressed willingness to help.

The TF13 Co-Chairs should look to get participation from other disciplines, such as maintenance and utilities.

Tuesday, September 24, 2002

National Cooperative Highway Research Program Project Updates – Chuck Niessner

Niessner briefed the members on the status of the following projects:

17-24	Use of Event Data Recorder (EDR) Technology for Roadside Crash Data Analysis (Active)
17-22	Identification of Vehicular Impact Conditions Associated with Serious Ran-Off-Road Crashes (Active)
17-14	Improved Guidelines for Median Safety (Active)
17-11	Determination of Safe/Cost Effective Roadside Slopes and Associated Clear Distances (Active)
17-10(2)	Structural Supports for Highway Signs, Luminaires, and Traffic Signals (Active)
17-10	Structural Supports for Highway Signs, Luminaires, and Traffic Signals (Completed)
22-19	Aesthetic Concrete Barrier and Bridge Rail Designs (Active)
22-18	Crashworthy Work-Zone Traffic Control Devices (Active)
22-17	Recommended Guidelines for Curbs and Curb-Barrier Combinations (Active)
22-16	Development of an Improved Roadside Barrier System (Completed)
22-15	Improving the Compatibility of Vehicles and Roadside Safety Hardware (Active)
22-14(02)	Improved Procedures for Safety-Performance Evaluation of Roadside Features (Active)
22-14	Improvement of the Procedures for the Safety-Performance Evaluation of Roadside Features (Completed)
22-13(2)	Expansion and Analysis of In-Service Barrier Performance Data and Planning for Establishment of a Database (Active)
22-13	Performance of Roadside Barriers (Completed)
22-12	Guidelines for the Selection, Installation, and Maintenance of Highway-Safety Features (Active)
22-11	Evaluation of Roadside Features to Accommodate Vans, Mini-Vans, Pickup Trucks, & 4-Wheel Drive Vehicles (Completed)
22-09	Improved Procedures for Cost-Effectiveness Analysis of Roadside Safety Features (Completed)

Details on these and other NCHRP Projects may be found on the Internet at:

http://www4.trb.org/trb/crp.nsf/NCHRP+projects

Affiliated Committee / Activity Reports

AASHTO Subcommittee on Bridges and Structures

Frederick reported that this subcommittee met in Atlantic City, NJ, in May. Technical Committee T-7 on Bridge Railings voted to reduce the height of Ped Bike railings from 54" to 42" to conform to crash tested railings. They also voted to revise their definitions of TL-5 and TL-6 to conform to NCHRP Report 350. He also reported on Technical Committee T-12 on Sign, Luminaire, and Traffic Signal Supports. A change to 50 years for the design life of luminaire supports was recommended, with certain structures less than 15 meters high being 25 years. A midyear meeting has been set for November 4 and 5 in Las Vegas, Nevada.

American Traffic Safety Services Association

Durkos reported that the ATSSA Guardrail Installation Training Course has been give four times, and is scheduled for about 6 more sites this year. It covers bidding, maintaining files, legal aspects, maintenance, and upgrading in addition to installation techniques. A Guard Rail Installer Level II course is in preparation. He also noted that the ATSSA Fly-In was held in Washington, DC, on September 20, in support of increased highway spending. ATSSA prepared a brief presentation on CD emphasizing the importance of highway safety funding that Durkos played for the TF.

Dinitz noted that ATSSA and other organization have been active in this pre – ReAuthorization era. ReAuthorization is very important to the highway industry. Because of funding uncertainty, states will be "prudent" in their lettings for the near term. **Collins** noted that AASHTO and AGC have put out information to help members support increases in funding levels. **Dinitz** concluded by saying how interesting it was to see the level of cooperation within this industry. While many states surpluses have turned to deficits, it is important to contact your Congressional representatives as they do listen to grass roots pleadings.

Old Business / New Business

The potential sites for the 2003 meetings were discussed. TF13 will aim towards April 23 and 24 in San Antonio, and will hope to continue meeting with TFRS in the fall.

Technical Presentations

(Please note that any references to passing or failing do not necessarily reflect the opinion of the FHWA until an acceptance letter has been written and signed.)

Ron Faller – Midwest Roadside Safety Facility reported on the following crash tests conducted this summer:

1. Tied down temporary steel H-Barrier. Angle brackets bolted on the front. One foot dynamic deflection.
2. Tied down F-shape concrete barrier with vertical holes in lower sloped face, rods anchored through deck.

3. Midwest Guardrail system. W-beam with splice at midspan, 31 inches to top of rail, 12-inch deep non-routed wood blockout. Length of Need tests passed with a deflection of 43 inches.
4. Midwest Guardrail system with 3 inch curb set 1 inch behind the back of curb. Length of need test passed with a 40 inch deflection.
5. Conventional W-beam guardrail, 27-inch top height, routed wood blockout, with wood post placed in excavated hole in rock, hole is backfilled with crusher-run material to provide support. For those situations where rock is near surface.

Martin Maners – MG Squared gave a presentation on the hazards of electrical wiring at the site of crashes where breakaway luminaire poles and other electrified structures have been struck. TF13 and the AASHTO Bridge Subcommittee Technical Committee T-12 deserve credit for promoting these devices.

Len Meczkowski – FHWA Turner Fairbank Highway Research Center discussed the FHWA-NHTSA National Crash Analysis. Finite element modeling and analysis has been done in the development of various recent barriers, including:

1. Indiana portable concrete barrier.
2. Pennsylvania portable concrete barriers.
3. Modified G41S guardrail with un-routed blockout – failed and it was determined that the routing was critical to the proper performance of the system.
4. W-beam transition
5. North Carolina cable barrier study
6. Secure mailboxes
7. Validation of tractor-trailer model

Durkos – Road Safety Inc. illustrated the new Box Beam Splitter terminal for use in shielding median pier obstacles. Each end of the barrier envelope has a BEAT to absorb the crash energy. The system was also tested with vehicles hitting the side in the vicinity of the piers. Passed.

Bullard and Alberson – Texas Transportation Institute teamed up to tell us about the following:
1. California Callbox tests with wood box retaining walls. System placed on cut slope passed, System placed on fill slope failed.
2. T-77 aesthetic bridge railing, 2-tube steel. Failure
3. Aesthetic concrete baluster bridgerail. Failure due to excessive deformation.
Because of the number of spectacular failures, TTI wins this years “exciting crash test video” awards. Now, let’s see how many of you read these minutes in this much detail to find this extraneous note.
4. Aesthetic concrete baluster bridgerail redesigned and successfully retested.
5. Mow strip guardrail – steel or wood posts embedded in sand-cement mixture to retard growth of grass and weeds. Tests on both systems were successful.
6. Dual post sign supports using schedule 40 pipe on triangular slip bases. Passed.
7. New cable guardrail terminal. FHWA requested additional test which failed. Terminal passed after being redesigned.
8. T202 Fiber Reinforced Bridgerail. Failed pick up test. Modified version with a 3 inch tall tubular steel box affixed to the top passed.

Masakazu Sugimoto – Nippon Steel Corporation informed the member of his research into the U – Shaped rib for the base of support poles that significantly reduces the incidence of fatigue cracks at the welds. Welding of the U-shaped rib onto the pole induces residual compressive stresses that overcome the fatigue loading imposed by wind loads and traffic vibrations.

Steve Barrett – CYRO Industries illustrated numerous examples of transparent plastic noise walls that his company has designed to retain their components when struck by an errant vehicle. This is especially important when the noise wall is on a structure over a roadway or community.

JOINT MEETING OF TASK FORCE 13 AND THE AASHTO TASK FORCE FOR ROADSIDE SAFETY TUESDAY, SEPTEMBER 24, 2002

JOINT DISCUSSION TOPIC #1: FUTURE OF CRASH TEST GUIDELINES

Dean Sicking graciously agreed to update the membership on the status of the contract that UNL has. He summarized the expected changes, and also noted that the new document will not result in the "surprises" that NCHRP Report 350 engendered. Proposed changes to the guidelines will be investigated, with crash testing if necessary, to determine their effect on current crashworthy hardware. In the vehicle area, single cab pickup trucks are becoming harder to find, and the standard vehicle may be the extended cab version. The difference between four-wheel-drive vs two-wheel drive will also be investigated. There was a discussion on the merits of the impact angle, i.e. 20 vs. 25 degrees for transitions and terminals.

Little concurred that the NCHRP project panel has adequate TFRS representation so the surprise factor will be taken out of the equation. Also, the successor to Report 350 will be an AASHTO document that has to go through the full voting process.

JOINT DISCUSSION TOPIC #2: ROADSIDE SAFETY ON RURAL TWO-LANE ROADS

Dinitz posed the question How can we find the money or otherwise promote the need for safety improvements off the National Highway System? **Berry** responded that Virginia is probably typical of many states when it pushes for more miles of pavement and less emphasis on roadside work and geometric improvements. **Collins** noted that there is enough money to maintain the NHS, but not enough is available for off-NHS roads. Should we continue spending the money on the NHS when it is a relatively safe system, or devote more money to the more dangerous non-NHS roads?

Dinitz recounted a low-cost safety project where vehicles frequently ran of the road at a curve on a downgrade. The use of raised pavement markers drastically improved the situation. **Kent Israel** noted that spot safety projects like that and curve flattening and intersection improvements are being done in Louisiana. According to **Drew Boyce** Delaware's Highway Safety Improvement Program isolates the top 30 crash sites each year and addresses them with minor improvements or plans for major work.

Dinitz asked if any manufacturers gear their products to rural two-lane roads? **Durkos** noted that some TL-2 devices are available, but local money isn't available to make use of these expensive

safety improvements. **Yodock** believes that the state specifications are not getting down to the locals. **Sicking** pointed out that the locals really don't understand the basics of roadside safety. There is a need for additional information and education efforts to go down to the county level. Local engineers can, with just a little more money, improve the condition of the roadside on their projects. **Stephens** noted that personnel at the municipal level have such wide-ranging responsibilities that they can't focus on safety. **Durkos** pointed out that the National Association of County Engineers would be a good conduit to bring locals up to speed on roadside safety concerns.

Albin pointed out that crashes on rural two-lane roads often occur at trees and poles, not locations were guardrail is used. The problem is a lack of funding, and the fact that local road administrators get their directions from political types who do not have safety in mind. "Context Sensitive Design" is being used to justify plantings close to the curb causing both roadside safety and sight distance problems.

Little commented on costs as well. Iowa has a structural resurfacing program that includes the upgrading of terminals, transitions, bridgerails, box culverts, etc. The State's new management complained that too much was being spent on safety. A careful analysis showed that only 2.7 percent of the project costs were being spent on these safety improvements – if that is all it costs, you cannot afford <u>not</u> to make these improvements. **Albin** said that Washington State's program is similar, and it allows resident engineers to program additional improvements up to $25K. Washington came up with a 17 percent proportion spent on safety work.

Dinitz suggested that the Roadside Design Guide be distributed to local agencies so that they will become aware of roadside safety standards. **Sicking** noted that LTAP focuses on construction and maintenance at present, but that they would be a logical means to distribute safety design information as well. **Dick Powers** noted that FHWA trained over two dozen RDG instructors last month, some of whom were LTAP people. The NHI has also offered the on-line training course at a bargain rate.

Bloschock said that locals complain about the high cost of guardrail terminals and when included on a state aid project, refuse to replace them when damaged. **Longstreet** observed in Pennsylvania where projects to extend culverts eliminate both the headwalls and the need for any approach guardrail. **Ghara** said that some counties/parishes are so poor that they cannot afford to pay the electric bill when a project provides highway lighting.

<u>JOINT DISCUSSION TOPIC #3</u> – FEDERAL FUNDING FOR SAFETY PROJECTS OFF OF THE NATIONAL HIGHWAY SYSTEM

Taylor noted that there is high political interest this year in having more money available for rural roads. **Dinitz** suggested that the Regional AASHTO meetings would be a good place to promote additional funding from the government.

<u>JOINT DISCUSSION TOPIC #4</u> – TRAINING OF SAFETY HARDWARE INSTALLERS

Berry opened up the topic with a discussion of GRIT – Guardrail Installer Training that was started by the FHWA Region Office in Baltimore. GRIT is now required for all VDOT contracts. Even though a lot of people have been trained some problems are still occurring, like using four blockouts on a bridge approach rail. **Ghara** commented that many in the state transportation

departments don't acknowledge that roadside design has evolved so much over the last number of years, and that our task is to overcome the apathy found in state highway organizations. We in TF13 are excited and knowledgeable about safety hardware, but most in the highway agencies do not share our enthusiasm. He also said that FHWA inspectors are some of the most knowledgeable inspectors that ever come on to the projects.

Stephens said Energy Absorption tries to make sure the guardrail sub has all the resources she/he needs and provides multiple copies of the drawings, a toll-free information number, and field people who are trained to help with the installation when called upon. Another problem arises because the guardrail contractor is usually one of the last subcontractors to work on a project and must deal with whatever errors or changes were made by others. **Dave Hubble** noted that the variability of funding over the course of years means that the number of skilled installers shrinks.

Little indicated that some safety hardware design features are not only hard to understand, but seem to be counter-intuitive. For example, slip base anchor bolts are intentionally short so that they will not interfere with the movement of the upper slip plane. And why be so concerned about torquing of bolts? Much of what we design is very subtle, much more so than most elements of highway construction. Overall, safety deserves much more in the way of funding, as some $80 billion is spent each year on highway crashes and their consequences. **Dinitz** stated that the F-SHARP program would address Safety, Mobility, Capacity, and Construction, with $140 million over six years.

<u>JOINT DISCUSSION TOPIC #5</u> WHAT CAN WE DO TO ACHIEVE A QUANTUM LEAP IN HIGHWAY SAFETY?

Berry favors education of designers and builders. **Dinitz** asked if ITS is a means to reduce crashes and their consequences. **Sicking** suggested that we really need to find out what is killing motorists in crashes. Relevancy is very hard to pin down, but if we knew where and how people are dying we can better focus our efforts. His study ("son of 350") is retrospective but what we really need is a prospective study of crashed to give us the correct information on crash and injury causation.

Alberson cautioned that he has a database of 500 NASS crashes with excellent information, but they still do not provide him with enough information to tell us what is actually causing the injuries. **Mack Christiansen** said that all fatal crashes in Utah are investigated, and their inspectors could be trained to look for and collect the information we need. **Cota** asked if EDRs will help in the near future, and **Sicking** said that they should be very useful. Finally, **Dinitz** closed with the question "How do we keep drivers on the road?" Rumble strips seem to be doing a good job, but what is out there that will keep some drivers from just drifting off of the pavement and onto the roadside?

Your Task Force 13 Secretary sees that as an excellent topic of discussion for the next meeting.

Respectfully submitted by Nicholas Artimovich, Federal Highway Administration Office of Safety Design this 8th day of October 2002.