

# COMMENT

## COMPUTER-GENERATED RE-ENACTMENTS AS EVIDENCE IN ACCIDENT CASES

BY BARRY SULLIVAN †

### I. INTRODUCTION

CO-PILOT

500 feet...400...300...200...100...50...40...30...20...10.

[sound of tires making contact]

PILOT

Boy, that's slick.

[sound of thrust reversers]

CO-PILOT

120 knots.

PILOT

No braking.

CO-PILOT

100 knots...80 knots...

PILOT

No braking, oh shit.

CO-PILOT

60 knots.

PILOT

Holy shit, we're going off the end...World's going off the end ...

[sound of crash]<sup>1</sup>

So ended World Airways Flight 30 as it skidded off a wet Logan Airport runway and plunged into Boston Harbor. In a relevant courtroom context, replaying such an audio recording of an airplane crash would undoubtedly capture a jury's attention.

Yet if a jury could not only *hear* what a pilot said but also *see* what a pilot saw, then a lawyer could make a much more powerful presentation.

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1. World Airways, Cockpit Voice Recording of Flight 30 (Jan. 23, 1982).

Until recently, a lawyer could obtain such visual information only from film of an actual airplane crash (an unlikely proposition) or film of a re-enactment of one (an expensive proposition). Today, however, a visual re-enactment of any accident -- including complex airplane crashes -- can be created through the use of a Computer-Generated Re-enactment ("CGR").<sup>2</sup>

For the purposes of this Comment, a CGR is defined as any visual re-enactment of an accident using computer animation -- a series of computer-generated images shown in rapid succession to create the illusion of motion. This definition encompasses a wide spectrum of possible computer involvement. At one extreme, a CGR combines a computer simulation of an accident<sup>3</sup> with computer animation techniques to produce the re-enactment. At the other extreme, a computer animator individually designs each image, using the computer merely as an animation "canvas."<sup>4</sup>

CGRs can produce a remarkable variety of images. They can generate objects which are two -or three-dimensional, black-and-white, colored, stick figured, or carefully shaded "solids." Moreover, CGRs can simulate motion by redrawing objects in slightly altered positions in successive images. Numerous visual special effects can also be added to a CGR to make a more effective presentation. These might include slow motion, stop motion, zoom-ins, zoom-outs, superimposed titles, or split-screens. The possibilities are limitless.

CGRs represent a major technological advance over motion picture re-enactments. Motion picture re-enactments create images by recording physical reality, while CGRs create images by processing numerical data. A motion picture's images remain forever fixed, but a CGR's images are altered simply by manipulating the underlying numerical data. This

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2. For example, Failure Analysis Associates of Palo Alto, California, produced a CGR of the World Airways crash. The cockpit voice recording was superimposed over computer-generated images showing a pilot's eye view of Flight 30's approach, landing, and crash. Telephone interview with Dr. Garrison Kost, Managing Engineer, Failure Analysis Associates (Nov. 24, 1987). The effectiveness of a seatbelt during a car crash and the path of an explosion inside a sewer system have also been subjects of CGRs. Demonstration videotape, Graphic Evidence, Los Angeles, California (1987); Demonstration videotape, Failure Analysis Associates, Palo Alto, California (1987).

3. A computer simulation of an accident consists of a set of commands, processed by a computer, which mathematically describe a model of the actual accident. A large number of parameters defining the accident should be included in the model to insure the model accurately reflects reality. One such computer simulation developed for the U.S. Department of Transportation can analyze multi-vehicle crashes and calculate post-crash trajectories for each vehicle. R. LIMPert, MOTOR VEHICLE ACCIDENT RECONSTRUCTION AND CAUSE ANALYSIS 433-35 (2d ed. 1984).

4. See *infra*, Section II.A.1, for a more detailed discussion of the CGR creation process.

allows a jury viewing a CGR to see accidents in ways never before possible.<sup>5</sup> A computer can generate a CGR of a multi-vehicle accident from an overhead, a driver's, or a pedestrian's perspective with equal ease.<sup>6</sup>

However, a CGR could mislead a jury just as easily as it could educate them. A CGR is only as good as the underlying eyewitness testimony, physical data, and engineering assumptions that drive its images. In other words, the old computer maxim "garbage in, garbage out,"<sup>7</sup> applies to CGRs.

Furthermore, a good CGR can re-enact an accident with an almost eerie reality. However wrong that reality may be, the danger exists that a jury will accept it unquestioningly. The reasons for this danger stem from the high quality of a CGR's images, the fact that a computer generated a R's images, and the fact the CGR appeared on a "TV."<sup>8</sup> This problem would seem to loom particularly large when the opposition does not offer their own CGR in rebuttal.

In recent years lawyers have started to introduce CGRs as evidence in court,<sup>9</sup> and there is good reason to believe they will increasingly do so in the future.<sup>10</sup> Thus, more and more courts will have to answer the fundamental question associated with CGRs: under what circumstances should a jury be permitted to view them?

Thus far, only the case of *People v. McHugh*<sup>11</sup> addresses that question. Furthermore, even *McHugh* cites no authorities and uses less than one page of analysis in dealing with the CGR admissibility issue. This dearth of legal authority poses problems for courts looking for guidance

5. Angel, . . . *And Computer Animation Takes the Court*, L.A. Daily J., June 12, 1987, (Special Section) at 8, col. 3.

6. Sherry McKenna notes:

Because the animation lives in a computer you don't have to worry about any of the physical constraints or any of the laws of nature; you can do elaborate camera moves, and you can change the perspectives. The animation is a three-dimensional object. It is not flat like traditional animation.

Video interview with Sherry McKenna, Robert Abel & Assoc., *Animation: Cartoons, Computers & Beyond*, Home Box Office, Inc. (1987).

7. *United States v. Burgess*, 691 F.2d 1146, 1155 (4th Cir. 1982).

8. As one noted authority on evidence stated:

[A] material object . . . when presented as purporting to be of a certain origin, always tends to impress the mind unconsciously, upon the bare sight of it, with the verity of its purport.

3 J. WIGMORE, *EVIDENCE IN TRIALS AT COMMON LAW* § 790, at 218 (Chadbourn rev. 1970).

9. See Harper, *Computer Evidence is Coming*, A.B.A. J., Nov. 1984, at 80, 82.

10. According to David Muir, Vice-President, Forensic Technologies International of San Francisco, California, in five to ten years technological improvements should bring the cost of CGRs down to one-tenth of today's costs. Angel, *supra* note 5, at 8, col. 4, 5.

11. 124 Misc. 2d 559, 476 N.Y.S.2d 721 (Sup. Ct. 1984).

in this area. This Comment attempts to fill that void by providing a theoretical legal backdrop for determining the admissibility of CGRs.

This Comment contains three sections. The first section provides background material in two areas: a technical explanation of the CGR creation process and a legal survey of pertinent case law and statutory authorities concerning related types of evidence. The second section defines the major issues surrounding CGR admissibility: the foundational analysis and standards courts should employ; the objections to CGRs courts should recognize; and whether CGRs should be allowed into the jury room during deliberations. The third section analyzes those issues, makes recommendations to courts, and gives practical advice to lawyers on both sides of the issues.

## II. BACKGROUND CONSIDERATIONS

### A. Technical Background: The CGR Creation Process

For a CGR to be admissible it must, like other demonstrative evidence, first be "*made a part of some qualified person's testimony*. Someone must stand forth as its testimonial sponsor, in other words (as commonly said) it *must be verified*."<sup>12</sup> Logically then, two types of witnesses could sponsor a CGR in an accident case: an expert witness who reconstructed the incident or an individual who was an eyewitness.<sup>13</sup> Thus, throughout this Comment reference is made to two main types of CGRs: Expert Witness CGRs and Eyewitness CGRs.

The following example explains the difference between the two categories. Assume a fire breaks out at a warehouse. The fire department soon arrives at the scene, and puts out the fire. Then an arson investigator arrives and gathers all available physical evidence in order to reconstruct what happened. A CGR illustrating what the arson investigator *believes* to have happened, based upon her expert reconstruction of the fire, would be an Expert Witness CGR. A CGR illustrating what one of the fireman *saw* would be an Eyewitness CGR.<sup>14</sup>

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12. 3 J. WIGMORE, *supra* note 8, at § 793 (emphasis in original); see also FED. R. EVID. 901(b)(1) (authentication accomplished with a witness' "[t]estimony that a matter is what it is claimed to be").

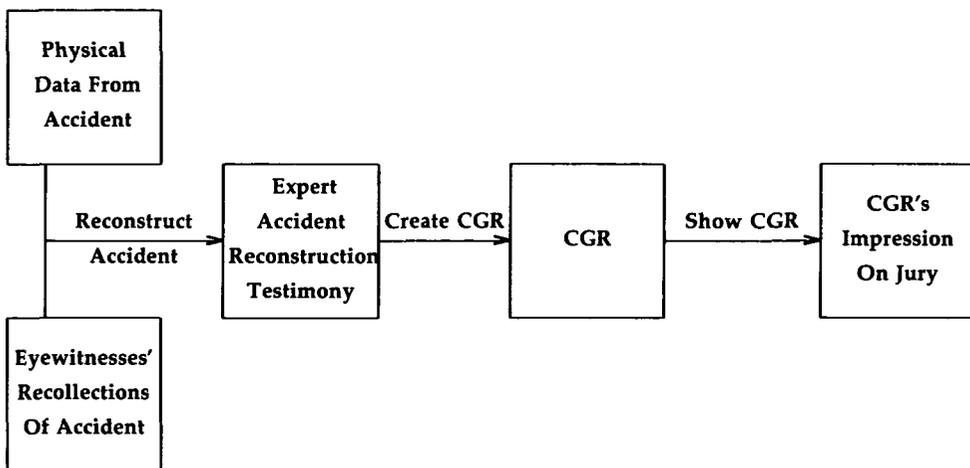
13. A third possible CGR "shepherding angel" -- the computer animator who actually builds the CGR -- would not need to sponsor the CGR at trial for the same reason that photographers are no longer needed to vouch for a photograph: in both situations an expert witness or eyewitness is available to authenticate the information contained within the exhibit. See 2 C. SCOTT, PHOTOGRAPHIC EVIDENCE § 1026 (2d ed. Supp. 1987).

14. The World Airways crash CGR described *supra* note 2, is an example of an Expert Witness CGR. The visual images were reconstructed from Flight 30's flight data recorder and not from a pilot's eyewitness recollections. Thus, a proper "shepherding angel"

The physical process of creating an Expert Witness CGR differs from that of an Eyewitness CGR. An Expert Witness CGR requires completion of three discrete steps. First, an expert must reconstruct the accident. Second, a computer animator must create a CGR based on the reconstruction. Third, the lawyer must show the CGR to the jury. In the case of an Eyewitness CGR, the accident has already been "reconstructed" -- in the form of the eyewitness' recollections. Since an eyewitness does not have to reconstruct the accident, the first two steps of the process collapse into one. The following chart illustrates the two methods of CGR creation.

### CHART A: CGR CREATION PROCESSES

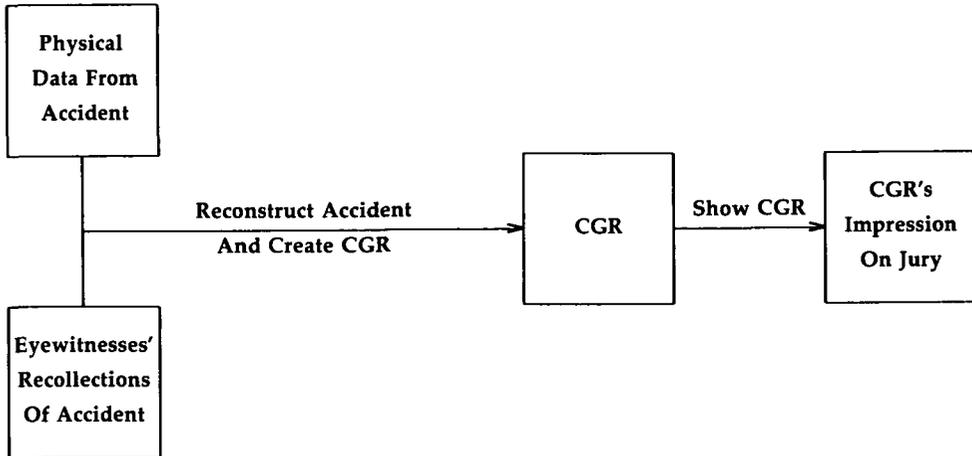
#### Expert Witness CGRs



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might be an aeronautical engineer who could testify that the CGR accurately reflected the recorded data.

## Eyewitness CGRs



The following two subsections on reconstructing an accident and on creating a CGR from that reconstruction provide a technical overview of the CGR creation process sufficient to make later material understandable. They are not exhaustive treatments of their topics.

### 1. RECONSTRUCTING AN ACCIDENT<sup>15</sup>

Although no two accidents are perfectly identical, an expert accident reconstructionist<sup>16</sup> attempts to determine the following details common to every accident: i) the physical factors involved in the accident; ii) the physical factors involved in the production of injuries; iii) the physical factors involved in avoiding the accident; and iv) the possible factors (physical or not) that might have mitigated or avoided injuries.<sup>17</sup> The final result is a supportable set of conclusions that describe what happened, how injuries occurred, and whether anything could have been done either before or during the accident to avoid those injuries.<sup>18</sup>

Although seemingly simple on paper, accident reconstruction, even for something as relatively simple as a single vehicle car crash, can be a complex undertaking requiring a detailed knowledge of engineering and physics. First, the accident reconstructionist must obtain all possible data

15. This step applies only to Expert Witness CGRs. Eyewitness CGRs do not require it because the accident has already been "reconstructed" in the eyewitness' memory.

16. The field of accident reconstruction -- sometimes called "accidentology" -- dates back at least to 1931. *See Fishman v. Silva*, 116 Cal. App. 1, 2 P.2d 473 (1st Dist. 1931) (non-eyewitness tow truck driver attempted to testify to cause of accident).

17. R. LIMPERT, *supra* note 3, at 1.

18. *Id.* at 3.

about the accident including eyewitness statements;<sup>19</sup> environmental data such as road surface and weather conditions; vehicle data such as the make and model of cars, collision damages, and braking system conditions; human data such as the occupants' weight, driving experience, and level of intoxication.<sup>20</sup> Second, the accident reconstructionist must analyze that data using complex mathematical formulae that take mass, acceleration, and braking force into account.<sup>21</sup>

Because of their complex nature, accident reconstructions can be either extremely precise accountings of what took place or clever manipulations masking mathematical mumbo-jumbo. Thus, lawyers on both sides of a lawsuit should *carefully* examine any CGR based upon an expert accident reconstruction by determining the validity of the reconstruction.

## 2. CREATING A CGR

When the time arrives to create an Expert Witness CGR, the accident reconstructionist<sup>22</sup> should have a clear opinion regarding the various positions and behavior of all pertinent objects during all phases of the accident. The job now becomes one of translating this engineering information -- or, in the case of an eyewitness, his recollections -- into a series of computer-generated images or animation.

Again, this subsection is not intended to be an exhaustive treatment of computer animation of accidents. It is meant only to be

19. See *infra*, Section IV.B, for the implications of hearsay eyewitness statements used in constructing CGRs.

20. R. LIMPET, *supra* note 3, at 489-500. The factors examined in different sorts of accidents would vary. For reconstructing an explosion, factors might include the flash point of the explosive involved, its amount, its location, and the strength and architecture of the structure where the explosion took place. For reconstructing the failure of a machine, the factors might include the machine's age, operating capacity, metallurgical characteristics, and maintenance history.

21. *Id.* at 171-294. One typically intimidating formula computes the time required for a wheel to produce its maximum braking force:

$$t_b = \frac{S_t I_w W_o}{O F_z R} + \frac{O F_z R}{K} \text{sec}$$

where  $F_z$  = tire normal force, lb;  
 $I_w$  = mass moment of inertia of wheel, lb \* in/sec<sup>2</sup>;  
 $K$  = brake force v. time slope, lb \* in/sec;  
 $R$  = tire radius, in.;  
 $W_o$  = initial wheel angular velocity, rad/sec;  
 $O$  = tire-road friction coefficient, d'less;  
 and  $S_t$  = tire slip, d'less.

*Id.* at 252-53.

22. The same reasoning applies to an eyewitness in the case of an Eyewitness CGR.

illustrative. One representative software method -- developed for micro-computer use by Wolf Technical Services of Indianapolis, Indiana -- will be described.<sup>23</sup>

First, the various three-dimensional objects involved in the accident must be described to the computer as a series of coordinate points and interconnecting lines. For example, a simple cube would have eight points, one for each corner, interconnected with twelve lines. A more complex object, like a car, may have hundreds of points interconnected by thousands of lines.<sup>24</sup>

Next, the motion of each object during each moment of the accident must be calculated. The accident reconstruction -- or eyewitness recollections -- will provide that data only for certain "benchmark" moments, so the computer must otherwise fill in the gaps. These spatial calculations utilize Newtonian physics to determine the motion for each object through three translational axes and three rotational directions.<sup>25</sup> In a sense, at this point the entire accident, in three dimensions, lives inside the computer's memory. After all these calculations have been made and stored, the computer busies itself with the task of translating that three-dimensional information into a series of two-dimensional images suitable for projection onto videotape or a computer monitor by using mathematical transformations.<sup>26</sup>

Since the objects exist only inside the computer's memory, various perspectives can be generated. For example, imagine the following images, taken from an actual CGR of a crash in which a Subaru and a semi-tractor/trailer travel in one direction while a Ford Bronco travels in the opposite direction.<sup>27</sup> Although the semi blocks the view of oncoming traffic, the Subaru attempts a left-hand turn. The Ford Bronco crashes into the Subaru, rolls three times, and comes to rest off the highway. A CGR could present various perspectives of the accident. For example, the CGR could show a flat overhead view similar to a map, an oblique

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23. Pepe, Huett, & Grayson, *Cost-Effective Real-Time Computer Simulation*, 1987 SAE/ESD INT'L COMPUTER GRAPHICS CONF. PROC 15.

24. *Id.*

25. *Id.* at 15-16.

26. This process sometimes takes several hours on a microcomputer because it must solve an enormous number of simultaneous equations. To speed up the performance to an acceptable level, an animation program examines each image and stores only the changed portions from the preceding image. *Id.*

27. *Id.* at 1-19. The Wolfe CGR was produced on a microcomputer. The vehicles in it appeared as stick figures. Due to their enormous computational power and memory capacity, supercomputers could have produced images more pleasing to the eye. For example, the vehicles could have appeared as carefully shaded "solids."

view in which the three-dimensional aspects of the objects become apparent, or a driver's perspective showing what the driver saw during the accident.

## B. Legal Background: Survey of Present Case Law

### 1. CASE LAW CONCERNING FOUNDATIONAL STANDARDS FOR ADMISSIBILITY

#### a. CGR Admissibility

The only reported case in the United States to directly address the admissibility of a CGR as evidence in accident cases is *People v. McHugh*,<sup>28</sup> in which the defendant sought to introduce a CGR which showed that adverse weather conditions, not drunken driving, caused an automobile crash. The prosecution made a motion for a pre-trial hearing to determine "whether the computer program and the incorporated scientific and mathematical formulas, techniques and processes underlying the program are generally accepted as accurate and reliable by the scientific community."<sup>29</sup> The court denied the motion. It characterized CGRs not as scientific evidence but more akin to charts or diagrams.<sup>30</sup> As such, the court held that the applicable standard of admissibility was merely whether the CGR "fairly and accurately" reflected the underlying oral testimony and aided the jury's understanding of the issue in question.<sup>31</sup> The court then directed the defendant to give the prosecution a copy of the computer program that generated the CGR, in order to eliminate a delay at trial which might occur during any *voire dire* on the evidence.<sup>32</sup>

Although on point, the *McHugh* opinion dismisses the admissibility problem with less than one page of analysis and cites no authority for its conclusions. This criticism does not mean *McHugh* was incorrect, only incomplete. A full and proper analysis of CGR admissibility requires a broadening of the scope of the *McHugh* court's inquiry. Thus, the following subsections discuss case law concerning the foundational standards applied to the two types of evidence most analogous to CGRs: accident reconstructions and motion picture re-enactments.

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28. 124 Misc. 2d 559, 476 N.Y.S.2d 721 (Sup. Ct. 1984).

29. 476 N.Y.S.2d at 722.

30. *Id.*

31. *Id.* at 723.

32. *Id.*

b. Accident Reconstruction Admissibility

Numerous cases throughout the United States discuss the propriety of admitting accident reconstruction evidence.<sup>33</sup> While courts uniformly prohibited such evidence at first,<sup>34</sup> most courts now appear to allow it to one degree or another. Nevertheless, some sharp disagreement remains over their admissibility.<sup>35</sup> In any case, courts that do permit accident reconstruction testimony have applied three different foundational standards to determine admissibility: the *Frye* test, the "substantially similar" test, and the Federal Rules of Evidence Rule 702 ("Rule 702") test.<sup>36</sup>

The *Frye* test arose out of the following passage from the case of *Frye v. United States*:<sup>37</sup>

[W]hile courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, *the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.*<sup>38</sup>

In *Frye*, the court held that the results of a systolic blood pressure lie detector test were not admissible because it had not yet "gained such standing and scientific recognition among physiological and psychological authorities."<sup>39</sup>

Even though the *Frye* test dates back to 1923 courts continue to use it to determine the admissibility of accident reconstruction testimony.<sup>40</sup>

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33. See generally 32 C.J.S. *Evidence* § 546(88) (Supp. 1987) (comprehensive list of accident reconstruction admissibility cases throughout the United States).

34. See, e.g., *Shelby Nat'l Bank v. Miller*, 147 Ind. App. 203, 259 N.E.2d 450, 470-71 (1970). In that case the court extensively discusses the history of accident reconstruction testimony non-admissibility in Indiana and concludes that such testimony may be proper in certain limited situations.

35. An illustration of this conflict can be seen by comparing *Hollingsworth v. Bovaird Supply Co.*, 465 So. 2d 311 (Miss. 1985) (overruling past precedent and allowing accident reconstruction testimony) to *Zachery v. Wheeler*, 511 F. Supp. 591 (E.D. Tenn. 1981) (barring accident reconstruction testimony).

36. E.g., *Polacec v. Voight*, 385 N.W.2d 867, 869-70 (Minn. Ct. App. 1986) (Rule 702 test); *Starr v. Campos*, 134 Ariz. 254, 655 P.2d 794, 797 (Ct. App. 1982) (*Frye* test); *Thorpe v. Commonwealth*, 233 Va. 609, 292 S.E.2d 323, 326 (1982) ("substantially similar" test).

37. 293 F.2d 1013 (D.C. Cir. 1923).

38. *Id.* at 1014 (emphasis added).

39. *Id.*

40. For example, in *Starr v. Campos*, *supra* note 35, printouts of a computer simulation of an accident between a volkswagen and a truck in the form of printouts was admitted during the testimony of the defendant's expert witness. On appeal the court characterized computer simulations as scientific evidence. In keeping with that characterization, it applied the *Frye* test and held the simulations may be admitted only if they are "derived from principles and procedures that have achieved general acceptance in the scientific field to which they belong." 655 P.2d at 797 (citing *Frye v. United States*, *supra* note 36; *State v. Mena*, 128 Ariz. 226, 624 P.2d 1274, 1279 (1981)).

The second foundational standard courts have applied to accident reconstruction testimony is the "substantially similar" test. A typical formulation of this test appears in *Thorpe v. Commonwealth*<sup>41</sup> using fairly typical language: the results of experiments or accident reconstructions are not admissible unless they were conducted under conditions that were "the same or substantially similar in essential particulars to those existing at the time of the original accident."<sup>42</sup> In that case, an accident reconstructionist gave his opinion concerning the speed of a gravel truck before it fell across a car. The expert had formulated his opinion by comparing skid marks ostensibly left by the truck with skid marks left by a police cruiser in a test along the same stretch of road. The court ruled that the expert opinion as to the truck's speed was inadmissible because there was "no evidence of similarity in essential particulars" of the skid mark test to the actual accident.<sup>43</sup>

The final standard courts have use to determine the admissibility of accident reconstruction testimony is the Rule 702 test. This test admits into evidence any "scientific, technical, or other specialized knowledge [that] will assist the trier of fact to understand the evidence or to determine a fact in issue . . . ."<sup>44</sup>

Since the Rule 702 test essentially relies only upon "traditional standards of relevance and the need for expertise,"<sup>45</sup> accident reconstruction testimony is much more likely to be admitted under it than under either the *Frye* test or the "substantially similar" test. Such a result is likely because both of the latter tests are subject to same relevance considerations as the former, yet, as mentioned earlier, they impose additional requirements. The case of *Polacec v. Voight*<sup>46</sup> illustrates the point. In that case an accident reconstructionist gave his expert opinion that the defendant was driving in the wrong lane just

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For a definition of "computer simulation," see *supra* note 4. Although in a sense a computer "re-enacted" an accident in *Starr* via a simulation, no computer animation was involved. Thus, the standard of admissibility for an accident reconstruction that extensively uses a computer may differ depending on whether the re-enactment is a simulation or an animation. See also *Schaeffer v. General Motors Corp.*, 372 Mass. 171, 360 N.E.2d 1062, 1067 (1977) (computer simulation of car accident requires a *Frye* evaluation before it can be admitted).

41. 223 Va. 609, 292 S.E.2d 323 (1982).

42. 292 S.E.2d at 326.

43. *Id.* In coming to a decision, the court noted the skid mark test employed a police cruiser instead of a fully loaded 53,560 pound truck, differences in braking and suspension systems between the two vehicles, and other missing factors that cast doubt upon the test results.

44. FED. R. EVID. 702 (emphasis added).

45. C. MCCORMICK, MCCORMICK ON EVIDENCE § 203, at 608 (E. Cleary ed. 3d ed. 1984).

46. *Supra* note 36. The court applied Minnesota's version of Rule 702.

before his car and a pickup truck collided. The accident reconstructionist had nearly no concrete details on which to base his opinion, yet the court, using the Rule 702 standard, admitted his opinion anyway.<sup>47</sup>

c. Motion Picture Re-Enactment Admissibility

Courts have also had many opportunities to rule on the admissibility of motion picture re-enactments of accidents.<sup>48</sup> Motion picture re-enactments include any visual recording -- including videotaped recordings -- of a staged accident prepared in contemplation of litigation.<sup>49</sup> Because staged accidents so closely resemble experimental evidence, courts have generally applied a "substantially similar" foundational standard to such re-enactments before admitting them.<sup>50</sup>

Note, however, the restrictive "substantially similar" foundational standard for motion picture *re-enactment* evidence does *not* apply to ordinary motion picture evidence.<sup>51</sup> Usually motion picture evidence operates under the more relaxed "fair representation of its subject" standard.<sup>52</sup> This is the same standard commonly applied to still photographs.<sup>53</sup> It allows a photograph into evidence whenever a witness with personal knowledge of a scene can verify the photograph fairly represents the scene the photograph depicts.<sup>54</sup> The reason for having a

47. The vehicles left no skid marks, the point of collision was not marked, the speed of the defendant's car was not known, the wheels of the pickup were free to move in any direction, the orientation of each vehicle was not known, and the amount of momentum expended in the collapse of the vehicles was not known. *Id.* at 869-70.

48. *See, e.g.,* Gorelick v. Dept. of State Highways, 127 Mich. App. 324, 339 N.W.2d 635 (1983); Balian v. General Motors Corp., 121 N.J. Super. 118, 296 A.2d 317 (1972), *cert. denied*, 62 N.J. 195, 299 A.2d 729 (1973); 41 A.L.R.4th 812, 863-65.

49. *See* 3 C. SCOTT, PHOTOGRAPHIC EVIDENCE, at § 1291 (Supp. 1984).

50. For example, in DiRosario v. Havens, 196 Cal. App. 3d 1224, 242 Cal. Rptr. 423 (2d Dist. 1987), the court characterized a videotape re-enactment of a car accident as experimental evidence and held that such an experiment, to be admissible, must be conducted under "substantially similar" conditions to those of the actual occurrence, 242 Cal Rptr. at 426. In applying that standard to the case's facts, the court decided that the conditions were "substantially similar" and that none of the dissimilarities cited by the defendant -- such as the sun's position above the horizon, the amount of traffic, etc. -- warranted barring the videotape, *Id.* at 426-27.

51. Examples of ordinary motion picture evidence would include "day-in-the-life" films used to demonstrate impairment, "tour" films used to show the layout of buildings, and "hidden camera" films used to identify criminals.

52. 3 C. SCOTT, *supra* note 14, at § 1297. Cases which apply the "fair representation of its subject" standard may use various formulations. Missouri Portland Cement v. United Cement, Lime, 145 Ill. App. 3d 1023, 496 N.E.2d 489, 491 (1986) ("correct representation of . . . facts"); Grimes v. Employers Mut. Liability Ins. Co., 73 F.R.D. 600, 609 (D. Alaska 1977) ("true and accurate representation").

53. 3 C. SCOTT, *supra* note 14, at §§ 1023 n.58, 1291 ("The basic principles which govern the admission of still pictures also govern the admission of motion pictures.').

54. *See id.*, at § 1297 n.35.

harsher standard applied to motion picture re-enactments probably stems from a belief that re-enactments pose "multiple risks of misrepresentation, exaggerated effect, and over-emotional jury reaction . . . ."55

## 2. CASE LAW CONCERNING OTHER POSSIBLE OBJECTIONS TO CGRS

The paucity of case law on CGRs<sup>56</sup> not only hampers efforts to formulate a proper CGR foundational standard, but it necessarily gives no indication to courts or lawyers of what *other* objections (besides Lack of Foundation) might be raised against a CGR during a trial. This subsection introduces the reader to those other objections.

By necessity, analogies supporting the existence of these objections are drawn from cases dealing with the two types of evidence most similar to CGRs: accident reconstructions and motion picture re-enactments. Generally, objections that attack underlying expert testimony rely on the accident reconstruction cases. On the other hand, objections that attack the propriety of a CGR itself find most of their analogies in the cases dealing with motion picture re-enactments. The hybrid nature of CGRs accounts for this wide range of analogous case law.

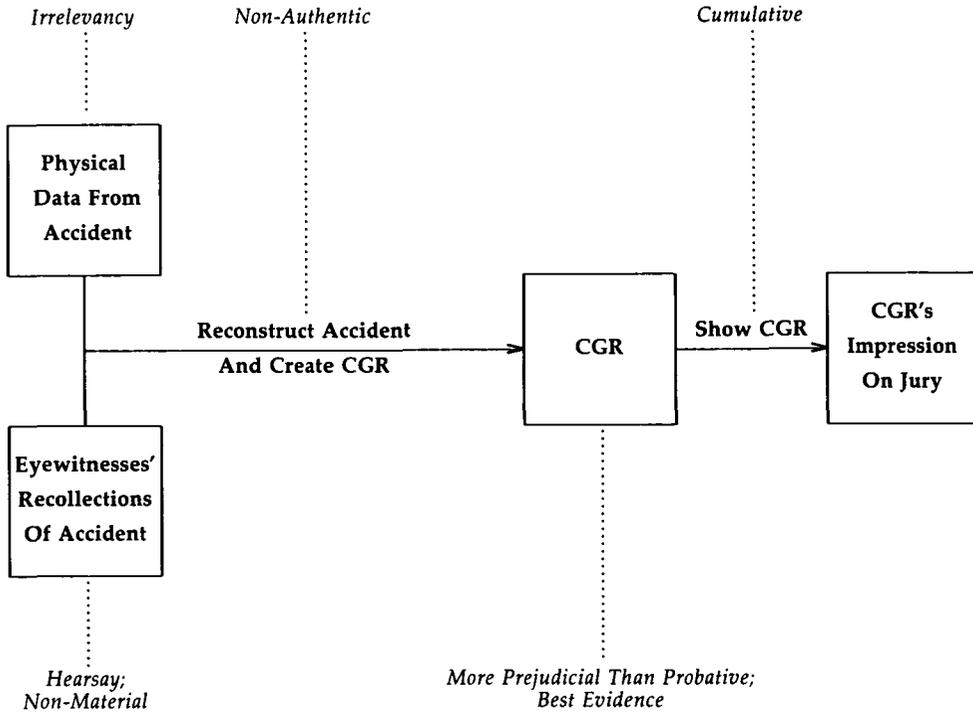
The following two charts illustrate the relationship between the process of creating CGRs -- both Expert Witness CGRs and Eyewitness CGRs -- and the possible objections to them.

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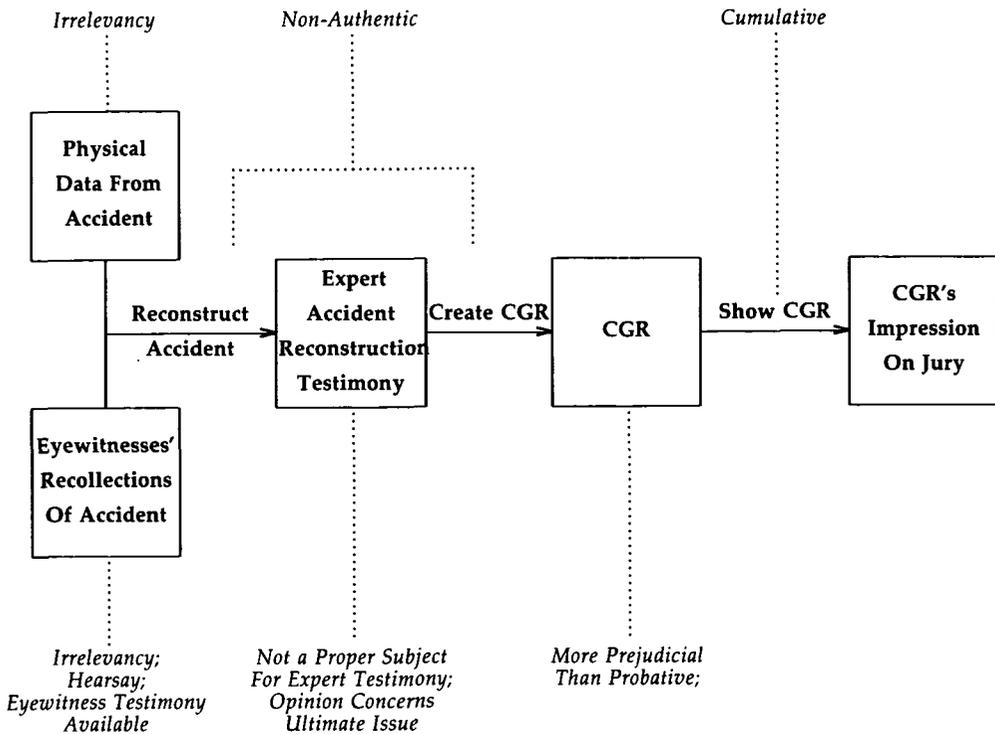
55. K. HUGHES & B. CANTOR, PHOTOGRAPHS IN CIVIL LITIGATION 206 (1973).

56. Only one reported case in the United States directly addresses the issue of CGR admissibility. *People v. McHugh*, 124 Misc. 2d 559, 476 N.Y.S.2d 721 (Sup. Ct. 1984).

### CHART B: POSSIBLE OBJECTIONS TO AN EYEWITNESS CGR



### CHART C: POSSIBLE OBJECTIONS TO AN EXPERT WITNESS CGR



Obviously, because of the differences between the two types of CGRs, some objections do not apply to both types of CGRs.<sup>57</sup>

These charts also point out the stage in the CGR creation process when a particular objection becomes "active." For example, a lawyer who attacks an Expert Witness CGR because it contains Hearsay, does not attack the CGR itself as much he attacks the underlying basis of the expert's oral accident reconstruction testimony. Implicit in this arrangement is the consequence that these objections work in one direction only. Thus, a successful objection to an Expert Witness CGR because it is More Prejudicial than Probative eliminates the CGR itself, but it has no effect on the admissibility of the underlying expert accident reconstruction testimony. On the other hand, a successful objection to expert

57. See *supra*, Section II.A, for a definition of Expert Witness CGRs and Eyewitness CGRs.

accident reconstruction testimony because it incorporates Hearsay eliminates not only the reconstruction but also the resultant Expert Witness CGR.

a. Irrelevancy

Possible Objection: Those portions of CGRs that incorporate facts tending to prove a proposition not in dispute at trial are inadmissible.

Relevant evidence is admissible at trial, but irrelevant evidence is not.<sup>58</sup> The modern definition of relevant evidence, exemplified by the Federal Rules of Evidence,<sup>59</sup> contains two elements: materiality and probativeness.<sup>60</sup> The materiality element tests whether evidence, assumed to be true, proves a proposition in dispute at trial.<sup>61</sup> The probativeness element tests whether evidence, true or not, tends to prove a proposition that admittedly is in dispute at trial.<sup>62</sup>

The Irrelevancy objection, as it pertains to CGRs, refers only to the materiality element. A CGR's probativeness, on the other hand, is tested by the More Prejudicial than Probative objection.<sup>63</sup> The two elements are tested as separate objections in this Comment because they become pertinent at different stages in the CGR creation process.<sup>64</sup>

In practice the Irrelevancy objection would apply to both Expert Witness CGRs and Eyewitness CGRs by attacking *any* immaterial fact incorporated within the CGR -- whether an eyewitness statement or physical data.

58. See 1 J. WIGMORE, *supra* note 8, at § 10 (Tillers rev. 1983); *Sears V. Southern Pacific Co.*, 313 F.2d 993, 995 (3d Cir. 1941).

59. "Relevant evidence" means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence. FED. R. EVID. 401.

60. The concept of materiality is found in the "any fact that is of consequence to the determination of the action" portion of Rule 401 while probativeness is found in the "more probable or less probable" portion. See FED. R. EVID. 401 advisory committee's note.

61. C. MCCORMICK, *supra* note 45, at § 185, at 541.

62. *Id.* at 542. For example, detailed photographs of a bound-and-gagged victim with his face eroded by ammonia burns do not help to resolve the issue of whether a defendant had aided and abetted a burglary. *Commonwealth v. Dankel*, 450 Pa. 437, 301 A.2d 365, 367-68 (1973). See also *Azimov's Estate v. Azimov*, 141 Ind. App. 529, 230 N.E.2d 450, 452 (1967) (probativeness "deals with the requirement that the evidence must logically tend to prove a material fact"); 1 J. WIGMORE, *supra* note 8, at § 2, at 14 (Tillers rev. 1983).

63. See Section II.B.2.g, *infra*.

64. See Charts B and C, *supra*.

b. Hearsay

Possible Objection: An Expert Witness CGR is inadmissible if based upon expert accident reconstruction testimony based, in turn, upon inadmissible eyewitness hearsay statements.<sup>65</sup>

Unless falling into a well-defined exception, hearsay statements -- out-of-court statements used to prove the truth of the matter asserted -- are inadmissible.<sup>66</sup> Expert accident reconstructions forming the basis of an Expert Witness CGR could run afoul of the hearsay rule if the reconstructionist relied upon impermissible hearsay statements when forming his opinion regarding the accident. Today's courts generally subscribe to a permissive view regarding the admissibility of expert opinion based on hearsay; a view patterned after the Federal Rules of Evidence.<sup>67</sup> The pertinent portion of the Federal Rules of Evidence provides:

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to him at or before the hearing. *If a type reasonably relied on by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.*<sup>68</sup>

Logically, under that view if accident reconstructionists as a field reasonably rely on hearsay eyewitness statements in reaching their conclusions, then an accident reconstruction based on such hearsay would be admissible as well as a resultant Expert Witness CGR. However, the Advisory Committee Note to Rule 703<sup>69</sup> specifically *disallows* accident reconstruction testimony based on hearsay eyewitness statements:

If it be feared that enlargement of permissible data may tend to break down the rules of exclusion unduly, notice should be taken that the rule requires that the facts or data "be of a type reasonably relied upon by experts in the particular field." The language would not warrant admitting in evidence the opinion of an

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65. This hearsay argument differs from an argument that posits that a CGR itself is hearsay. A CGR, though made out of court and being used to prove the truth of the matter asserted, is subject to cross-examination through the witness who verifies and uses it. Thus, hearsay objections on this secondary basis are groundless. 3 J. WIGMORE, *supra* note 8, at § 791, at 228.

Hearsay problems also arise, but to a subtler degree, with Eyewitness CGRs. For example, the eyewitness may have been hurt in the collision and thus not able to fully perceive the salient events. Later, however, the eyewitness may have heard other people's recollections of the accident and then, subconsciously or not, adopted those recollections as his own.

66. C. MCCORMICK, *supra* note 45, at § 246, at 584 (E. Cleary 2d ed. 1972).

67. C. MCCORMICK, *supra* note 45, at § 15, at 39 (discussing judicial acceptance of FED. R. EVID. 703).

68. FED. R. EVID. 703 (emphasis added).

69. Advisory Committee Notes to Federal Rules are "persuasive" authority but not binding authority on courts. See *United States v. Ruminer*, 786 F.2d 381, 396 (10th Cir. 1986).

"accidentologist" as to the point of impact in an automobile collision case based on statements of bystanders, since this requirement is not satisfied.<sup>70</sup>

Even though the note refers only to point of impact accident reconstruction testimony, its exception probably covers *all* accident reconstruction testimony.<sup>71</sup>

Furthermore, the traditional view of courts also rejected outright *any* expert opinion if it was based on inadmissible evidence such as hearsay.<sup>72</sup> Otherwise, it was thought, a jury may accept the opinion as true when it had no facts in evidence to support it.<sup>73</sup> Some courts still hold this viewpoint.<sup>74</sup> However, other courts, while adhering to the traditional approach, have softened it by disallowing expert opinion only when it was based *solely* on hearsay.<sup>75</sup>

### c. Eyewitness Testimony Available

Possible Objection: An Expert Witness CGR is inadmissible if its underlying accident reconstruction testimony is barred because an eyewitness is available to testify.

Some states subscribe to an exclusionary rule that expert accident reconstruction testimony may not be given when an eyewitness to an accident is available to testify.<sup>76</sup> If an eyewitness is available, then this objection would apply to bar an Expert Witness CGR because

70. FED. R. EVID. 703 advisory committee's note. The note undoubtedly uses "point of impact" hearsay as an example and not as the exclusive exception to the rule. This exception probably bars all accident reconstruction testimony based on hearsay.

71. *See, e.g.,* Faries v. Atlas Truck Body Mfg. Co., 797 F.2d 619, 624 (8th Cir. 1986) (FED. R. EVID. 703 advisory committee's note cited to bar state trooper's opinion of motorcyclist's speed (not point of impact) because trooper relied on out-of-court statements of truck driver).

72. C. MCCORMICK, *supra* note 45, at § 15, at 38.

73. *Id.*

74. *Armstead v. Smith*, 434 So. 2d 740, 742-43 (Ala. 1983) (accident reconstruction testimony barred because expert relied upon police officer's out-of-court statements and conclusions).

75. "Texas courts have followed the general rule that *where it appears a witness' testimony is predicated both upon personal observation and upon hearsay, his testimony is inadmissible.*" *Lovell v. Dehoney*, 615 S.W.2d 276, 278 (Tex. Ct. App. 1981) (quoting *Moore v. Grantham*, 599 S.W.2d 287, 289 (Tex. 1980), quoting *Slaughter v. Abilene State School*, 561 S.W.2d 789, 791 (Tex. 1977)) (emphasis in original). Subsequently, however, Texas adopted Rule 703, which a lower Texas court relied on to effectively overturn *Moore*. *Liptak v. Pensabene*, 736 S.W.2d 953 (Tex. Ct. Civ. App. 1987) (opinion based solely on hearsay testimony permissible if relied on by an attorney expert).

76. *Milton v. Britton*, 19 Ill. App. 3d 922, 312 N.E.2d 303, 308 (1974).

the impermissible expert accident reconstruction testimony would always forms its basis.<sup>77</sup> Similarly, this objection would never bar an Eyewitness CGR because, by definition, an Eyewitness CGR illustrates *eyewitness* testimony and nothing more.

The rationale for this prohibition is that if an eyewitness is available, then expert accident reconstruction testimony on how an accident occurred is redundant and therefore improper.<sup>78</sup> Although this objection and the Not a Proper Subject for Expert Testimony appear to cover the same ground -- i.e., barring "improper" expert testimony -- the latter objection uses entirely different rationales.<sup>79</sup>

#### d. Non-Authentic

Possible Objection: A CGR is inadmissible if it does not accurately portray what it purports to represent.

In order for demonstrative evidence to be admissible, the proponent must prove, via an authenticating testimonial sponsor, that the evidence is what it purports to be.<sup>80</sup> Otherwise the evidence is inadmissible.<sup>81</sup> With CGRs, the rationale for this objection springs from the remote nexus between an accident and a CGR of it -- both in time<sup>82</sup> and construction<sup>83</sup> -- which creates numerous possibilities for distortion and fabrication. As Dean Wigmore wrote about motion picture re-enactments:

Theoretically, of course, the motion picture [re-enactment] can never be assumed to represent the actual occurrence; what is seen in it is merely what certain witnesses say was the thing that happened. And, moreover, the party's hired agents may so construct it as to go considerably further in his favor than the witnesses' testimony has gone. And yet, any motion picture is apt to cause forgetfulness of this and impress the jury with the convincing impartiality of Nature herself.<sup>84</sup>

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77. See Section II.A.1, *supra*.

78. See, e.g., *Levin v. Welsh Brothers Motor Service, Inc.*, No. 87-114, slip op. at \_\_\_ (Ill. App. Ct. Dec. 1, 1987) (accident reconstructionist barred because "evidence in the form of eyewitness testimony" was available). Cf. *Seward v. Griffin*, 116 Ill. App. 3d 749, 452 N.E.2d 558, 568 (1983) (reasoning that if an eyewitness is available to testify to the determinative facts of an accident, then a jury can resolve the issue without the aid of an expert unless a special scientific principle is involved).

79. See Section II.B.2.e, *infra*.

80. 3 J. WIGMORE, *supra* note 8, at § 793.

81. *Id.*

82. The CGR may be produced several months or years after the accident.

83. For example, two intermediate steps stand between an Expert Witness CGR and the accident it represents: reconstructing the accident and creating the CGR of the accident reconstruction.

84. 3 J. WIGMORE, *supra* note 8, at § 798(a), at 260.

In a practical sense, a CGR resembles the motion picture re-enactment discussed by Dean Wigmore: a CGR shows a "re-enacted" accident on recorded media; a CGR represents only what a witness says happened, not the accident itself; and, the computer animator who builds the CGR could construct it so as to go considerably further in her party's favor than the witness' testimony has gone.

The distortions and fabrications this objection would combat could creep into a CGR during the two different stages of the CGR's creation: when reconstructing the accident or when creating the CGR. Thus, for Expert Witness CGRs this objection would apply either when expert accident reconstruction testimony does not accurately portray the underlying physical facts surrounding the accident or when the CGR itself does not accurately portray the accident reconstruction testimony. For Eyewitness CGRs, however, this objection would apply only when the CGR does not accurately reflect the eyewitness' stated version of the accident. The few available cases lending theoretical support to this objection can be fit within this two-step framework.

For example, distortions or fabrications stemming from the first step -- reconstructing an accident -- result from the fact that an expert accident reconstruction requires a sophisticated analysis of a multitude of factors to produce an acceptable result.<sup>85</sup> The complexity of the task results in numerous avenues for mathematical mistakes or deliberate misrepresentation of underlying data. Thus, courts have barred reconstructionist testimony when the data used in the calculations was wrong or unreliable<sup>86</sup>, or the data used was insufficient.<sup>87</sup> Other objectionable mistakes, not yet addressed by a court, could be committed during this step as well: a reconstructionist could fail to apply the right combination of physical equations to determine the paths of the objects involved in the accident; the reconstructionist could make a simple miscalculation; or an unscrupulous reconstructionist could lie.

A few analogous cases deal with distortions or fabrications generated during the second step: actually creating a CGR. Theoretically such distortions should be easier to catch than ones in the first step

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85. See Section II.A.1, *supra*.

86. For example, in the case of *Armstead v. Smith*, 434 So. 2d 740, 743 (Ala. 1983), the court held that an accident reconstructionist had impermissibly based his coefficient of friction calculations upon the hearsay statements of a police officer concerning how slick a highway was at the time of the accident.

87. In *Liskiewicz v. Le Blanc*, 5 Conn. App. 136, 497 A.2d 86, 88 (1985), the court noted the expert had no evidence of the positions of the vehicles before impact and held that the portion of his testimony regarding pre-impact positions was properly excluded. See also *Davidson v. Municipality of Metro. Seattle*, 43 Wash. App. 569, 719 P.2d 569, 573 (1986) (expert reached his opinion "by drawing inferences from facts not in evidence or by assuming facts actually conflicting with eyewitness testimony").

because the test here is whether the CGR accurately matches the expert witness' or eyewitness' testimony. The court can judge for itself whether the CGR presents a more favorable version of the accident than the witness' testimony warrants.<sup>88</sup>

e. Not a Proper Subject for Expert Testimony

All expert testimony requires successful completion of a two-pronged admissibility test : i) the issue in question must so distinctly relate to some science, profession, business, or occupation as to be beyond the ken of laymen; and ii) the potential expert witness must possess sufficient skill, knowledge, or experience to render an opinion concerning that issue.<sup>89</sup> A violation of either of these prongs results in the inadmissibility of the expert testimony. From this rule arises the following two possible objections to Expert Witness CGRs:

i. Beyond the Ken of Laymen

Possible Objection: An Expert Witness CGR is inadmissible if its underlying expert accident reconstruction testimony sheds light on an issue the jury could easily understand without the expert testimony.

This objection derives from the exclusionary principle that expert testimony may not be given to illuminate an issue at trial that can be resolved by people "of ordinary experience . . . of common education, in ordinary walks of life."<sup>90</sup> The problem here, of course, would be deciding when an issue falls beyond the ken of the average juror and when an issue does not.

No easy generalizations can be made concerning how this objection would be applied to expert accident reconstructions (and thus to Expert Witness CGRs) because courts have used differing standards<sup>91</sup> and have produced inconsistent results.<sup>92</sup>

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88. *Id.*

89. C. MCCORMICK, *supra* note 45, at § 13, at 33.

90. 31 AM. JUR. 2D *Expert Witnesses* § 146 (1967).

91. Compare *Crawford v. Rogers*, 406 P.2d 189, 192 (Alaska 1965) (test is whether jury can "receive appreciable help") with *Hollingsworth v. Bovaird Supply Co.*, 465 So.2d 311, 315 (Miss. 1985) (test is whether evidence is "potentially helpful").

92. E.g., *Zachery v. Wheeler*, 511 F. Supp. 591, 592-93 (E.D. Tenn. 1981) (accident reconstruction testimony barred); *Hollingsworth*, 465 So. 2d at 315 (accident reconstruction testimony admitted).

## ii. Non-Qualified Expert

Possible Objection: An Expert Witness CGR is inadmissible if its underlying expert accident reconstruction testimony is barred because the expert was not qualified.

Expert accident reconstruction testimony is inadmissible if offered by a witness not properly qualified to give such an opinion.<sup>93</sup> This objection derives from a self-evident rationale: expert opinions should only be given by true experts in the relevant field.

Since courts have broad discretion in determining expert's credentials,<sup>94</sup> hard and fast guidelines do not exist for deciding whether an expert is qualified to make an accident reconstruction. In general courts will accept professional stature, education, extent of knowledge, experience, and training in the field as indications an expert is qualified.<sup>95</sup> However, courts will not accept mere academic "titles" as proof of expertise.<sup>96</sup>

The case of *Bornn v. Madagan*<sup>97</sup> provides an example of the qualification of experts problem. During that trial the defendant put on a mechanical engineer who had extensive experience in accident reconstruction. The court held that he was "qualified to give such testimony."<sup>98</sup> In contrast, the plaintiff attempted to put on two police officers to give expert testimony concerning the same issues covered by the engineer. However, the court held the police officers' testimony was inadmissible.<sup>99</sup> It reconciled the seemingly inconsistent results by noting the mechanical engineer's qualifications coincided with the requirements of the issue in question but that the police officers' qualifications did not.<sup>100</sup>

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93. See C. MCCORMICK, *supra* note 45, at § 13, at 33.

94. *Salem v. United States Lines Co.*, 370 U.S. 31, 35 (1962); FED. R. EVID. 104(a) ("qualification of a . . . witness . . . shall be determined by the court").

95. P. GIANELLI & E. IMWINKELRIED, *SCIENTIFIC EVIDENCE* at 154-57.

96. *Id.*

97. 414 N.W.2d 646 (Iowa Ct. App. 1987).

98. 414 N.W.2d at 648.

99. *Id.* at 649-50.

100. As the court stated: "Our courts are of the persuasion that it is not enough for a witness to be qualified as an expert in a certain general area; that witness must be qualified to answer the particular question involved." *Id.* at 650. See also *Ruden v. Hansen*, 206 N.W.2d 713, 717 (Iowa 1973).

f. Opinion Embraces Ultimate Issue

Possible Objection: An Expert Witness CGR is inadmissible if its underlying expert accident reconstruction testimony embraces the ultimate issue in the case.

Experts generally may not give accident reconstruction testimony "which amounts to no more than an expression of [a] general belief as to how the case should be decided."<sup>101</sup> In other words, expert opinion testimony embracing the ultimate issue in a case is inadmissible.

But determining what is the ultimate issue in an accident case and thus determining what is permissible expert accident reconstruction testimony may not be an easy matter. Accident cases usually involve apportioning fault. Thus, two sorts of expert opinion regarding accident reconstructions might be objectionable. One sort would be a blatant expert opinion that the jury ought to decide for a certain party or that a party was clearly in the wrong. The other sort operates on a more subtle basis. It encompasses an expert opinion decisive on an important issue in the case. For example, if the only issue in a products liability case was whether a tire failed from a blowout before a crash or from the crash itself, then this objection would probably bar testimony from a tire expert who examined fragments of the tire and formulated an opinion as to when the tire failed.<sup>102</sup>

On the other hand, today's majority view towards this objection, originally formulated in 1942<sup>103</sup> and culminating with the adoption of the Federal Rules of Evidence,<sup>104</sup> rejects the use of this objection outright.<sup>105</sup>

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101. C. MCCORMICK, *supra* note 45, at § 12, at 30 n.2.

102. For example, in *Ratterree v. Bartlett*, 238 Kan. 11, 707 P.2d 1063, 1068 (1985), the court allowed police officers who had investigated a crash to testify that all four wheels of one vehicle were on the shoulder of the road when the crash occurred. However, the court also held the officers were properly prohibited from testifying on whether they thought the vehicle was trying to pass at the time. 707 P.2d at 1068. It reasoned the testimony "would have invaded the province of the jury on the ultimate issue of negligence." *Id.*; *Twidwell v. Davidson*, 54 Wash. 2d 75, 338 P.2d 326, 329-32 (1959) (en banc).

103. *Grismore v. Consolidated Products Co.*, 232 Iowa 328, 5 N.W.2d 646 (1942); C. MCCORMICK, *supra* note 46, at § 12, at 30 n.6.

104. Testimony in the form of an opinion or inference otherwise admissible is not objectionable because it embraces an ultimate issue to be decided by the trier of fact. FED. R. EVID. 704.

105. *Yankanwich v. Wharton*, 460 A.2d 1326, 1329-30 (Del. 1983); *Edwards v. Didericksen*, 597 P.2d 1328, 1329, 1331 (Utah 1979). *But see* *Bornn v. Madagan*, 414 N.W.2d 696 (Iowa Ct. App. 1987) ("[W]e do not think testimony which essentially relates an opinion as to the relative fault of the parties is a proper subject for expert testimony.").

g. More Prejudicial Than Probative

Possible Objection: A CGR is inadmissible if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury.

Even though a piece of evidence may be probative -- that is, it alters the probabilities of an issue of importance in the case<sup>106</sup> -- it can still create other, collateral, impressions on the jury's mind. In fact, these collateral impressions may distract the jury from considering the evidence's probativeness. When that happens, evidence, "[a]lthough relevant . . . [must] be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues or misleading the jury . . . ."<sup>107</sup>

Unfair prejudice in this context "means an undue tendency to suggest a decision on an improper basis, commonly, though not necessarily, an emotional one."<sup>108</sup> Since virtually all evidence is prejudicial to some degree,<sup>109</sup> exclusion of evidence on this basis requires something more than mere prejudice:

[E]vidence ought not to be excluded at the mere hint of risk, and should only be kept out if the likelihood of its proper use in the case is "substantially outweighed" by the risk that it will *unduly arouse* the emotions of the jury or be misused.<sup>110</sup>

The case of *Wilson v. Piper Aircraft Corp.*<sup>111</sup> provides an example of the use of this objection to evidence analogous to CGRs. In *Wilson*, the plaintiffs' personal representatives claimed that an inadequate seat belt system caused the plaintiffs' deaths in a airplane crash. The Supreme Court of Oregon barred the use of a film entitled "Restraints for Survival" by the plaintiffs' expert on aircraft occupant safety.<sup>112</sup> It reasoned the following prejudicial features of the film outweighed its probative value: i) the film had been prepared several years earlier as an "effective" emotional appeal for increased use of seat belts; ii) it made liberal use of music to make dramatic points; iii) it showed repeated views

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106. *United States v. Pugliese*, 153 F.2d 497, 500 (2d Cir. 1945) ("All that is necessary . . . is that each bit may have enough rational connection with the issue to be considered a factor contributing to an answer").

107. FED. R. EVID. 403. See also 1 J. WIGMORE, EVIDENCE IN TRIALS AT COMMON LAW, at § 10a (Tillers rev. 1983).

108. *Ballou v. Henri Studios, Inc.*, 656 F.2d 1147, 1155 (5th Cir. 1981) (quoting FED. R. EVID. 403 advisory committee's note).

109. *Id.* at 1155.

110. 2 D. LOUISELL & C. MUELLER, FEDERAL EVIDENCE § 126, at 37 (rev. 1985) (emphasis added).

111. 282 Or. 61, 577 P.2d 1322 (1978) (en banc), *reh'g denied*, 282 Or. 411, 579 P.2d 1287 (1978).

112. 577 P.2d at 1331.

of what appeared to be a dead body beside the wreckage of a small airplane; and iv) it showed close-up shots of dummies used in test crashes with their faces smeared with red to simulate blood.<sup>113</sup>

#### h. Cumulative

Possible Objection: A CGR is inadmissible if it merely repeats, by illustration, its underlying expert witness or eyewitness testimony.

Courts will bar repetitive testimony whenever it amounts to nothing more than a "needless presentation of cumulative evidence."<sup>114</sup> This problem may crop up frequently with CGRs. Expert Witness CGRs and Eyewitness CGRs, by definition, are computer-animated re-enactments of the witness' testimony. In that sense, a CGR always repeats the witness' testimony.

Important considerations underlie this objection. The trial court's time, witness' time, and jurors' time are all public commodities that should not be wasted; further, trial lawyers should be restrained in their use of repetitious proof or unnecessary waiting periods.<sup>115</sup> This objection would validate those considerations by barring CGRs that add nothing beyond what a witness has already testified.<sup>116</sup>

### 3. ADMISSIBILITY OF CGRS INTO THE JURY ROOM

Case law and statutory authorities do not give a definitive answer on whether CGRs can be brought into the jury room during a jury's deliberations. However, the following general rule emerges from a survey of those authorities: all admitted exhibits can be brought into the jury room unless they are mere testimonial aids or evidence having a solely testimonial character.<sup>117</sup>

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113. *Id.* at 1331.

114. FED. R. EVID. 403. This objection must be distinguished from the "harmless error" rule, which concerns appellate review of cumulative evidence. This subsection discusses cumulative evidence problems at the trial level only. *See, e.g.,* Quinn v. Millard, 358 So. 2d 1378, 1383 (Fla. Dist. Ct. App. 1978) ("[B]ut the opinions stated by plaintiffs' expert witnesses nevertheless constituted only *cumulative evidence* such that, even if error had existed in their admission, such error would have been *harmless*." (emphasis added)).

115. 2 D. LOUISELL & C. MUELLER, *supra* note 110, § 128, at 68.

116. Various courts have impliedly recognized the theoretical basis underlying this objection by barring analogous evidence. For example, in *State v. Hopperstad*, 367 N.W.2d 546 (Minn. Ct. App. 1985), the court held that a videotaped re-enactment of a crime was impermissibly admitted into evidence because it was cumulative, in that it merely "restated the testimony of the State's preceding three witnesses." *Id.* (applying Minnesota's version of Rule 403). *See also* Zachery v. Wheeler, 511 F. Supp. 591, 595 (E.D. Tenn. 1981) (citing FED. R. EVID. 403 to exclude accident reconstruction testimony).

117. As the following paragraphs illustrate, however, courts sometimes bar "admissible evidence" from the jury room and sometimes permit "testimonial aids" or evidence of a "solely testimonial character" to go inside.

Some states have statutory mandates that all admissible evidence can be brought into the jury room.<sup>118</sup> Note, however, that even if a court admits an exhibit into evidence, it generally still retains discretionary authority to bar it from the jury room.<sup>119</sup> For example, in *State v. Ross*<sup>120</sup> the Washington Court of Appeals<sup>121</sup> held that a trial judge abused his discretion by permitting an unsupervised jury to bring an emergency 911 tape recording of the victim into the jury room.<sup>122</sup>

In jurisdictions without such a statutory mandate, however, courts can generally prohibit the introduction of exhibits into the jury room by characterizing them as testimonial aids.<sup>123</sup> For example, in *United States v. Cox*<sup>124</sup> the Ninth Circuit held that mockup bombs used by an expert to explain how some detonated bombs may have been built should not have gone into the jury room because they were merely an aid to the expert's testimony and not evidence.<sup>125</sup> On the other hand, some cases allow testimonial aids to go into the jury room.

Exhibits characterized as solely testimonial in character are also usually barred from going into the jury room.<sup>126</sup> Testimonial evidence in

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118. See, e.g., *State v. Strandy*, 49 Wash. App. 537, 745 P.2d 43 (1983). In *Strandy*, the Washington Court of Appeals held that a videotape which had been admitted into evidence properly went into the jury room during deliberations despite the fact it graphically depicted not only the crime scene but also the victims of a murder, how they were tied up, and the locations of their wounds. Despite arguments that the videotape added nothing beyond an autopsy report already in evidence, the court cited clear statutory language compelling its decision: the "jury shall take with it . . . all exhibits received in evidence . . . ." 745 P.2d at 47 (quoting WASH. REV. CODE ANN. Title 10 App. CrR 6.15(e)) (emphasis added by court). See also *First Employees Ins. Co. v. Skinner*, 646 S.W.2d 170, 171-72 (Tex. 1983) (holding that TEX. CIV. PROC. RULES ANN. R. 281 (Vernon 1977) mandated that writings admitted into evidence had to go into the jury room during deliberations regardless of whether any of the parties made such a request).

119. *Pakul v. Montgomery Ward Co.*, 282 Minn. 360, 166 N.W.2d 65, 68 (1969); C. MCCORMICK, *supra* note 45, § 217, at 681.

120. 42 Wash. App. 806, 14 P.2d 703 (1986).

121. Division 1 of the Washington Court of Appeals decided this case while Division 2 decided *Strandy*.

122. *Ross*, 714 P.2d at 707. Although the court held the emergency 911 tape recording to be admissible evidence, it also held that under the peculiar circumstances of the trial the defendant's 6th Amendment right to confrontation had been violated. *Id.* at 706-07.

For other cases acknowledging that courts have such discretionary authority yet holding the trial judge did not abuse his discretion in allowing evidence into the jury room, see e.g., *La Chance v. Thermogas Co. of Lena*, 120 Wis. 2d 569, 357 N.W.2d 1, 6 (Ct. App. 1984) (photographs); *State v. Frazier*, 99 Wash. 2d 180, 661 P.2d 126, 13-32 (1982) (tape recorded confession).

123. "Testimonial aids" refers to all trial exhibits used merely for illustrative purposes.

124. 633 F.2d 871 (9th Cir. 1980), *cert. denied*, 454 U.S. 844 (1981).

125. *Id.* at 874-75. However, the court also held the error was harmless. *Id.*

126. E.g., *Williams v. First Sec. Bank of Searcy, Ark.*, 293 Ark. 388, 738 S.W.2d 99 (1987); *Rossell v. Volkswagon of America*, 147 Ariz. 160, 709 P.2d 517, 529 (1985), *cert.*

this sense can be thought of as evidence which almost indistinguishably repeats testimony a witness gave on the stand. For example, in *Chambers v. State*<sup>127</sup> the court held that a videotape of an out-of-court interview of a crime victim should not have been given to the jury during deliberations.<sup>128</sup> It reasoned that the danger of undue emphasis on what the victim had to say increases the more her testimony was repeated.<sup>129</sup>

### III. CGR ADMISSIBILITY ISSUES

The following section introduces the main issues which will be more fully addressed by this Comment. These issues are intended to encompass the most probable and practical problems judges and lawyers will face when considering the admissibility of CGRs.

#### A. What Foundational Standards Should Apply to CGRs?

Courts facing CGR admissibility for the first time must determine the necessary quantum of proof a CGR proponent must present before a CGR can be admitted into evidence.<sup>130</sup> In other words, courts must choose an appropriate CGR foundational standard. This task is not as easy as it may appear: not all CGRs are alike;<sup>131</sup> the pool of available foundational standards is not small;<sup>132</sup> and those standards were developed for analogous -- but not perfectly analogous -- evidence.<sup>133</sup>

In order to arrive at the proper foundational standards, an analytical framework must first be developed that accounts for the differences between Expert Witness CGRs and Eyewitness CGRs. An eyewitness CGR has admissible eyewitness testimony as its basis, so it is subject only to a motion picture re-enactment standard for admissibility of the re-enactment itself. Unlike an Eyewitness CGR, an Expert Witness CGR possesses a dual nature: part expert accident reconstruction testimony

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*denied*, \_\_\_ U.S. \_\_\_, 106 S. Ct. 1957 (1986) (automobile battery system, though merely a testimonial aid, allowed into jury room).

127. 726 P.2d 1269 (Wyo. 1986).

128. *Id.* at 1276-77.

129. *Id.* at 1276; Taylor v. State, 727 P.2d 274, 277 (Wyo. 1986).

130. See 3 C. SCOTT, *supra* note 13, § 1297 at 154 ("[M]otion pictures, like all other forms of photography, are inadmissible without *preliminary proof of reliability.*") (emphasis added).

131. CGRs fall into two broad categories: Expert Witness CGRs and Eyewitness CGRs. See Section II.A, *supra*.

132. See Section II.B.1, *supra*.

133. In a nutshell, CGRs differ from simple accident reconstructions because CGRs present information visually, and CGRs differ from motion picture re-enactments because the visual information in CGRs can be manipulated by a computer. See Section I, *supra*.

and part motion picture re-enactment.<sup>134</sup> A court must establish a proper foundational standard for admissibility of both facets of an Expert Witness CGR.

For example, if a court chooses to apply a foundational standard suitable only for admissibility of expert opinion testimony, then potentially objectionable aspects of an Expert Witness CGR escape scrutiny. This would occur if the Expert Witness CGR contains inflammatory matter such as dramatic music or distorted colors. In such a case the CGR is objectionable under a motion picture re-enactment standard and yet is still scientifically accurate. On the other hand, by applying only a motion picture re-enactment foundational standard, a court might admit an Expert Witness CGR that accurately illustrates the underlying expert accident reconstruction, even though the reconstruction itself contains miscalculations, omissions, or lies.

To solve this problem, a court must first choose a proper foundational standard for the underlying accident reconstruction testimony of the expert witness CGR. Three potentially suitable foundational standards have been used by courts in analogous situations: the Frye test, the "substantially similar" test, and the Rule 702 test.<sup>135</sup> The choice is not simple because all of those standards possess advantages and disadvantages.

Next, a court must choose an appropriate foundational standard for the re-enactment itself. By this point in the admissibility analysis, Expert Witness CGRs have already undergone a preliminary foundational examination of its expert accident reconstruction testimony. This means Expert Witness CGRs and Eyewitness CGRs now stand on the same footing: both now have admissible testimony as a base. A court must finally choose a foundational standard which insures that a CGR reliably reflects its underlying testimony, whatever its source. However, the choice here is not simple because two possible candidates exist: the motion picture re-enactment "substantially similar" standard and the motion picture "fair representation of its subject" standard.<sup>136</sup>

## **B. How Should Courts Handle Other Objections to CGRs?**

The second major issue facing courts and lawyers involves the multitude of other objections that might be raised against a CGR besides lack of a foundational standard. For each possible objection courts must

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134. See Section II.A, *supra*. An Expert Witness CGR, by definition, uses expert accident reconstruction testimony as its bases while an Eyewitness CGR uses simple eyewitness testimony.

135. See Section II.B.1.b, *supra*.

136. See Section II.B.1.c, *supra*.

establish the following: i) whether to recognize a particular objection at all by taking into account broad policy considerations and case law authorities; and ii) the appropriate situations when a recognized objection can be properly applied against a CGR.

### C. Should CGRs be Allowed into the Jury Room?

Finally, assuming a CGR survives the above challenges and is shown to the jury, a court must decide whether to permit the jury to take the CGR into the jury room during deliberations.

Obviously, a lawyer who manages to secure a CGR in the jury room possesses a great advantage over her opponent. The jury might replay the CGR again and again, reinforcing its psychological impact while the opposing lawyer remains powerless to counteract it.

The following section analyzes these issues and offers practical advice on how to resolve them.

## IV. ANALYSIS OF CGR ADMISSIBILITY ISSUES

### A. The Foundational Issue

#### 1. THE PROPER ANALYTICAL FRAMEWORK

Expert Witness CGRs and Eyewitness CGRs differ from each other in one important respect: Expert Witness CGRs are based upon an expert opinion in the form of accident reconstruction testimony while Eyewitness CGRs are based upon an eyewitness' testimony concerning the witness' recollection of the accident.<sup>137</sup> Subjecting both types of CGRs to the same standard would either be too restrictive on Eyewitness CGRs if an expert opinion standard were exclusively employed or too permissive on Expert Witness CGRs if a motion picture evidence standard were employed. For example, if a court chooses to apply a foundational standard suitable only for expert opinion evidence, then potentially objectionable aspects of an Expert Witness CGR would escape scrutiny.<sup>138</sup> The converse would also be true.<sup>139</sup>

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137. See Section II.A, *supra*.

138. The Expert Witness CGR could contain inflammatory matter such as dramatic music or distorted colors which would be objectionable under a motion picture re-enactment standard, but still scientifically accurate.

139. By applying *only* a motion picture re-enactment foundational standard, a court might admit an Expert Witness CGR that accurately reflects the underlying expert accident reconstruction, even though the reconstruction itself contains miscalculations, omissions, or lies.

The following two-step procedure for analyzing the admissibility of all CGRs solves this problem: i) for Expert Witness CGRs, determine the admissibility of the underlying expert accident reconstruction by applying an appropriate expert opinion foundational standard; and ii) determine the admissibility of the CGR itself (both Expert Witness CGRs and Eyewitness CGRs) by applying an appropriate motion picture evidence foundational standard.

Support for this two-step procedure can be found in *People v. McHugh*,<sup>140</sup> which addresses the admissibility of an Expert Witness CGR. The court, in dicta, alluded to such a procedure: "[w]hat is important is that the presentation . . . fairly and accurately reflect the oral testimony offered and that it be an aid to the jury's understanding of the issue."<sup>141</sup> The "aid to the jury's understanding of the issue" portion of the passage paraphrases Rule 702 of the Federal Rules of Evidence -- an expert opinion foundational standard.<sup>142</sup> Similarly, the "fairly and accurately reflect the oral testimony offered" portion is analogous to the foundational standard used in motion picture re-enactment cases.<sup>143</sup>

Although the *McHugh* court did not give any reasons for adopting a two-step procedure, the following arguments militate in favor of it. First, as mentioned above, use of the bifurcated procedure insures fairer results than if one category of foundational standard were used to the exclusion of the other. Second, it promotes clarity of analysis. The two-step procedure, by dividing an Expert Witness CGR into its components for admissibility purposes, forces a court to point out precisely where an Expert Witness CGR becomes objectionable.<sup>144</sup> This precision not only helps a CGR proponent to rectify the objectionable problem, but it also helps build clearer case law for the future should the case reach an appellate level. Third, the two step procedure correlates well with the process necessary to create an Expert Witness CGR:<sup>145</sup> everything in the process beginning with obtaining initial accident data and until the expert's accident reconstruction falls under the aegis of step i), while everything beyond that point, starting with creating the CGR itself, falls under the aegis of step ii). Under this procedure, preliminary questions such as irrelevance and hearsay are dealt with in the expert's

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140. 124 Misc. 2d 559, 476 N.Y.S.2d 721 (Sup. Ct. 1984).

141. 476 N.Y.S.2d 723 (emphasis added).

142. For a fuller discussion of FED. R. EVID. 702, see Section IV.A.2, *infra*.

143. See, e.g., *People v. Long*, 38 Cal. App. 3d 680, 690, 113 Cal. Rptr. 530, 537 (4th Dist. 1974).

144. For example, the Non-Authentic objection might be applied at two different points in the Expert Witness creation process: when reconstructing the accident or when creating the CGR. See Section IV.B, *infra*.

145. See Section II.A, *supra*.

oral testimony rather than after objectionable facts may have been incorporated and possibly hidden within a CGR.

In contrast, Eyewitness CGRs do not require a two-step procedure to determine admissibility. Since an Eyewitness CGR lacks an underlying expert accident reconstruction, the need for evaluating an Eyewitness CGR under an expert opinion foundational standard never arises. However, as with an Expert Witness CGR, an Eyewitness CGR may contain prejudicial or cumulative matter, thus calling for at least a motion picture evidence standard of admissibility. The second step of the procedure would operate the same for Eyewitness CGRs as for Expert Witness CGRs: preliminary objections such as irrelevancy and hearsay would be considered beforehand when the eyewitness offers oral testimony.

## 2. THE PROPER FOUNDATIONAL STANDARD FOR EXPERT

### a. Accident Reconstruction Testimony

As discussed above, courts have adopted three different foundational standards, or necessary quantum of proof, for expert accident reconstruction testimony. All three of these foundational standards -- the Frye test, the "substantially similar" test, and the Rule 702 test -- possess both advantages and disadvantages. The following paragraphs explain why of the three, the Rule 702 test gives courts the most workable foundational standard for the purposes of CGR admissibility.

In order for a court to admit accident reconstruction testimony under the Frye test, a lawyer first must establish the following: "the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs."<sup>146</sup> At first blush, determining whether a method of reconstructing accidents has "gained general acceptance" may seem irrelevant as an indicator of its intrinsic reliability.<sup>147</sup> Despite this initial problem, a number of arguments justifying the Frye test have been made: it promotes uniformity in evidence rulings; it shields juries from treating novel scientific evidence as infallible; it avoids time-consuming courtroom spectacles; and it prohibits the introduction of novel evidence until a significant number of experts can testify to its reliability.<sup>148</sup>

However, the Frye test has come under increasing attack in recent years for a number of reasons.<sup>149</sup> For example, the Frye test does not

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146. *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923).

147. The court in *State v. Williams*, 4 Ohio St. 3d 53, 446 N.E.2d 444, 447-48 (1983), pejoratively called this process "scientific nose-counting."

148. C. MCCORMICK, *supra* note 46, at § 203, at 607-08.

149. P. GIANELLI & E. IMWINKELRIED, *supra* note 95, at 25-28.

explain how "general" the "general acceptance" must be in the particular field in which it belongs.<sup>150</sup> It does not explain whether the "thing" to be accepted is a particular procedure's ability to measure an effect<sup>151</sup> or a higher scientific principle.<sup>152</sup> It does not explain how a court should determine the "particular field" in which scientific evidence belongs.<sup>153</sup> Finally, in a new scientific field the Frye test acts to suppress otherwise reliable evidence simply because its body of knowledge and pool of experts are small.<sup>154</sup>

Expert Witness CGR admissibility would probably suffer under the Frye test because underlying accident reconstruction testimony would almost always be barred. First, it may be difficult to prove that the methods employed in a particular reconstruction have "gained general acceptance" in the reconstruction field. The factors surrounding every accident are different. Consequently every accident reconstruction is different. In addition, the problem of determining the "particular field" in which reconstruction testimony belongs especially plagues accident reconstruction because of its close relationship to other fields such as physics, engineering, metallurgy, and chemistry. For example, a judge may be reluctant to accept testimony from an expert reconstructionist in a traffic accident case because the opinion incorporates the use of Newtonian physics to determine the paths of vehicles. This reluctance may prevent accident reconstruction from being recognized as a distinct scientific field. Lastly, accident reconstruction is an emerging field.<sup>155</sup> Judges would be justified under *Frye* in barring accident reconstruction testimony because a "significant" pool of experts does not yet exist.

The "substantially similar"<sup>156</sup> test has one primary advantage: its theoretical ability to exclude confusing evidence.<sup>157</sup> Unless the accident

150. This produces inconsistent results. Compare *United States v. Brown*, 557 F.2d 541 (6th Cir. 1977), cert. denied, 401 U.S. 994 (1971) (results of ion microphobic analysis excluded) with *United States v. Stifel*, 433 R.2d 431 (6th Cir. 1970) (results of neutron activation analysis admitted). See generally C. MCCORMICK, *supra* note 46, at § 203, at 608.

151. E.g., a lie detector's ability to measure physiological distress.

152. E.g., the link between physiological distress and lying.

153. For example, in bite mark comparison cases, courts have not agreed on the "particular field" to which that specialty belongs. *People v. Slone*, 76 Cal. App. 3d 611, 625, 143 Cal. Rptr. 61, 69 (2d Dist. 1978) ("dentistry"); *People v. Milone*, 43 Ill. App. 3d 385, 356 N.E.2d 1350, 1357 (1976) ("odontology").

154. See P. GIANELLI & E. IMWINKELRIED, *supra* note 95, at 27.

155. See Becherer, *Accident Reconstruction for Lawyers*, in ACCIDENT RECONSTRUCTION 4, 8 (1982) ("In recent years, the use of [accident reconstruction experts] to perform the entire analysis of the accident has increased.").

156. See Section II.B.1.b, *supra*.

157. *Jackson v. Fletcher*, 647 F.2d 1020, 1027 (10th Cir. 1981) ("The object of the rule which requires substantial similarity of conditions is to prevent admission of evidence which tends to mislead and perhaps confuse the jury.").

reconstruction testimony is shown to be "substantially similar" to the events of the original accident, the reconstruction should be excluded because it would be speculative and of insufficient probative value to the jury.<sup>158</sup>

However, the "substantially similar" test can be criticized on three grounds which warrant its rejection. First, it suffers from the same definitional vagueness as the *Frye* test. Terms such as "substantial" and "essential" lend themselves to a wide range of interpretations.<sup>159</sup> This lack of predictability makes planning a pre-trial strategy difficult. A lawyer would never know until the trial itself whether the accident reconstruction testimony would be admitted. Second, the "substantially similar" test implicitly requires independent knowledge of the conditions surrounding the original accident against which the court measures the accident reconstruction for similarity. However, this independent knowledge requirement cannot be met in many situations. Examples would include a single-car accident where the driver is killed or a hit-and-run accident where the non-fleeing driver is killed and the fleeing driver is never found.<sup>160</sup> Furthermore, the logic of this test fails to offer admissibility guidance when the accident reconstruction is deliberately dissimilar to the original accident. This situation would arise when an accident reconstruction "controls" for a certain factor in order to eliminate it as a possible cause of the accident.<sup>161</sup>

In contrast, the Rule 702 test displays much more flexibility than the first two tests. It would admit into evidence any "scientific, technical, or other specialized knowledge [that] will assist the trier of fact to understand the evidence or to determine a fact in issue . . ." <sup>162</sup> This test possesses two advantages. First, unlike the *Frye* test or the "substantially similar" test, the Rule 702 test closely aligns itself with the proposition

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158. See *State v. Stringer*, 292 Or. 388, 639 P.2d 1264, 1278 (1982) (Tongue, J., dissenting); see also *Solis v. So. Cal. Rapid Transit Dist.*, 105 Cal. App. 3d 382, 164 Cal. Rptr. 343, 348 (2d Dist. 1980) ("Several courts have indicated that no admissible expert opinion could be reached as to the course of vehicles or bodies after impact, where such course is still under varying elements of human control.").

159. For example, under this test computer simulations of car accidents might be barred under the theory that only a full-scale re-creation of the accident (complete with vehicles of the same make and model, etc.) would be "substantially similar" to the actual accident.

160. See K. HUGHES & B. CANTOR, *supra* note 55, at 206 ("It is entirely predictable that no such re-enactment will ever duplicate the facts and circumstances that obtained on the original occasion.").

161. See *Schaeffer v. General Motors Corp.*, 372 Mass. 171, 360 N.E.2d 1062 (1977) (computer simulation of accident modified to "control" for possible effects of faulty car differential).

162. FED. R. EVID. 702 (emphasis added).

that all relevant evidence should be admissible,<sup>163</sup> which assumes a jury will reach a more just decision when the jury has more, rather than less, information. The Rule 702 test would not arbitrarily exclude relevant accident reconstruction testimony simply because a group of scientists has not accepted the method employed or because the reconstruction does not perfectly re-enact an accident.<sup>164</sup> Second, this test suffers from far less ambiguity than either of the other tests, which should produce more uniform results.<sup>165</sup> In addition to those two unique advantages, the Rule 702 test also incorporates advantages found in the other two tests. Like *Frye*, the Rule 702 test saves time<sup>166</sup> and produces uniform results.<sup>167</sup> Like the "substantially similar" test, this test eliminates irrelevant evidence.<sup>168</sup> In short, the Rule 702 test provides a more workable foundational standard.<sup>169</sup>

### 3. THE PROPER FOUNDATIONAL STANDARD FOR CGRS

Expert Witness CGRs and Eyewitness CGRs now stand on more or less the same footing: both have admissible testimony on which to base the CGR. The Expert Witness CGR has admissible expert accident reconstruction testimony and the Eyewitness CGR has admissible eyewitness testimony. The task now becomes one of determining the admissibility of the CGR itself.

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163. FED. R. EVID. 402 note by Federal Judicial Center (admissibility of all relevant evidence "constitute[s] the foundation upon which the structure of admission and exclusion rests").

164. See 1 D. LOUISELL & C. MUELLER, *supra* note 110, at § 105 (1977) (arguing scientific evidence ought to be subject to ordinary standard of relevance and need for expertise and not a special standard).

165. The Rule 702 test uses the "assist the trier of fact" standard, of admissibility which is far less subjective than the "gained general acceptance" standard used by the *Frye* test or the "substantially similar" standard.

166. With the Rule 702 test, no time needs to be spent during the trial to determine the collateral issue of whether an accident reconstruction method has "gained general acceptance" or if the reconstruction is "substantially similar" to the accident.

167. E.g., by providing an easier and therefore more predictable standard to apply.

168. The only practical difference is that the Rule 702 test examines the relevance of all evidence as a preliminary matter with a single standard (Rule 402) while the "substantially similar" test examines the relevance of scientific evidence in a special inquiry with a separate standard.

169. At least one commentator anticipates a period of flux as courts grapple with deciding which standard to apply:

The Advisory Committee Note to Rule 702 does not mention *Frye*'s general acceptance test, and the [Rule 702] standard may be thought to conflict with *Frye*. . . .

Whether intended or not, it may be that the silence of the Rules on scientific evidence will provide a period of experimentation following which a generally applicable standard might be adopted.

A.B.A., EMERGING PROBLEMS UNDER THE FEDERAL RULES OF EVIDENCE 200-02 (G. Joseph ed. 1983).

Two possible foundational standards for CGRs exist: the motion picture re-enactment "substantially similar" test and the less restrictive motion picture "fair representation of its subject" test.<sup>170</sup> For the reasons enumerated below, this Comment recommends that courts reject the "substantially similar" test and adopt a modified motion picture test which inquires whether a CGR is a "fair representation of underlying oral testimony."

The motion picture re-enactment "substantially similar" test poses difficult problems if applied to all CGRs. First, this test would apply a highly restrictive expert opinion foundational standard to Eyewitness CGRs. Eyewitness CGRs are not meant to be perfect re-enactments of accidents, merely a means for an eyewitness to communicate with the jury.<sup>171</sup> Applying a "substantially similar" standard to Eyewitness CGRs would beg the question, because to determine what happened in the accident for comparison purposes requires eliciting testimony from the eyewitness. Thus, an Eyewitness CGR would always be "substantially similar" to the accident because the witness has adopted the CGR as the true version of the accident.

Second, the "substantially similar" standard defeats the purpose of the two-step procedure, which is to analyze expert opinion as a preliminary matter and then analyze Expert Witness CGRs and Eyewitness CGRs together under an appropriate non-expert opinion foundational standard. With Expert Witness CGRs, this test merely duplicates the same expert opinion analysis performed in the first step of the CGR analytical framework. Subjecting an Expert Witness CGR to two separate expert opinion tests, but no motion picture test, creates the unwelcome possibility that an Expert Witness CGR will yield scientifically accurate results yet deviate from the eyewitness' testimony during the trial. For example, the oral reconstruction testimony may state that a vehicle was traveling at 30 miles per hour, which is scientifically accurate, but the Expert Witness CGR of the reconstruction shows the vehicle traveling at 45 miles per hour. This sort of distortion would not be caught by employing two expert opinion tests. The "substantially similar" test also suffers from a number of internal deficiencies, especially when applied to expert accident reconstruction testimony.<sup>172</sup>

A motion picture "fair representation" standard more closely corresponds to the nature of CGRs. Eyewitness CGRs and expert Witness CGRs, that have survived the Rule 702 analysis, and Eyewitness CGRs share many physical similarities with simple motion picture

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170. See Section II.B.1.c, *supra*.

171. See Section II.A, *supra*.

172. See Section IV.A.2, *supra*.

evidence. Thus, they should be subject to a foundational standard appropriate to that type of evidence. For example, CGRs and motion pictures both amount to nothing more than a collection of images. In the case of CGRs, the images take the form of computer-drawn diagrams while in the case of motion pictures the images take the form of still photographs. CGRs and motion pictures both create the illusion of motion by rapidly projecting those images one at a time. CGRs and motion pictures both can be accompanied by soundtracks, can be edited to delete harmful material, and can be enhanced by special effects and other "camera" tricks.

The only substantive difference between the two media lies in their respective sources of information for imagery: numerical data for CGRs and physical reality for motion pictures. Reliance on numerical data for images makes CGRs much more vulnerable to tampering and manipulation than motion pictures. The color, speed, size, or path of a car in a CGR could be changed in an instant at any time by altering a few variables in the computer program. With a motion picture, such factors could be changed, but it would require reshooting the entire scene with all its actors and objects.

This problem, however, ultimately matters little because both CGRs and motion pictures derive their value as evidence not from the source or even the content of their imagery, but from the fact that a competent witness verifies the imagery and adopts it as a "non-verbal expression of [her] testimony . . . ." <sup>173</sup> The images within a CGR could be changed hundreds of times before trial, but if, at trial, an eyewitness will verify that the CGR accurately portrays what she saw, or an expert witness will verify that the CGR accurately portrays what she reconstructed, then the question of manipulation of CGR imagery before trial becomes moot.

In short, the traditional foundational test applied to a motion picture -- whether it is a "fair representation of its subject" <sup>174</sup> -- presents a much more suitable foundational standard within the recommended analytical framework than the "substantially similar" test.

Despite its advantages, the "fair representation of its subject" test is not problem-free. For example, it may be difficult to define the "subject" of a CGR. The "subject" might be the original accident. If that is the case, a court would exclude a CGR that did not fairly represent the accident in terms of lighting, point-of-view, time-of-day, weather conditions, et cetera. Alternatively, the "subject" of a CGR could be the underlying *oral testimony* of the witness who sponsors the CGR. This

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173. 3 J. WIGMORE, *supra* note 8, § 790, at 218-19 (emphasis in original).

174. 3 C. SCOTT, *supra* note 13, § 1297.

Comment recommends the adoption of this latter alternative. In other words, a CGR should be excluded only if it is not a fair representation of a witness' underlying oral testimony.<sup>175</sup>

As mentioned previously, a CGR represents nothing more than a shorthand method for a witness to communicate his testimony to a jury. A judge employing a "fair representation of the accident" standard (instead of "fair representation of oral testimony") to bar a CGR, has, in essence, declared the witness' testimony within the CGR to be perjury or at least insufficiently probative for submission to the jury. This would "be as anomalous as if the judge were to order a witness from the stand because he was believed by the judge to be lying."<sup>176</sup> Questions of witness credibility belong with the jury and should not be predetermined by the judge.<sup>177</sup>

A further advantage of the "oral testimony" inquiry exists for Expert Witness CGRs in particular. By this stage, an Expert Witness CGR has already undergone a wholly separate foundational analysis to determine the admissibility of its underlying accident reconstruction testimony.<sup>178</sup> A court that adopts a "fair representation of the accident" standard instead of a "fair representation of oral testimony" standard would needlessly duplicate much of the previous analysis when it examines the link between the accident and the Expert Witness CGR. Since the link between the conditions of the accident and the expert's accident reconstruction has already been examined, the best way to avoid such wasted effort would be to restrict the new analysis to the link between the expert's accident reconstruction, as stated in her oral testimony, and the Expert Witness CGR.

Finally, under the "fair representation of oral testimony" standard, both Expert Witness and Eyewitness CGRs still remain subject to such basic objections as Irrelevancy, Hearsay, Non-authentic, More Prejudicial than Probative, and Cumulative. This gauntlet of objections provides much of the same admissibility protections as the more restrictive "fair representation of the accident" standard while presenting none of its "perjury" problems.

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175. See *People v. McHugh*, 124 Misc. 2d 559, 476 N.Y.S.2d 721, 723 (Sup. Ct. 1984) (CGR should "fairly and accurately reflect the oral testimony offered. . .").

176. 3 J. WIGMORE, *supra* note 9, § 792, at 238.

177. 3 J. WEINSTEIN & M. BERGER, *WEINSTEIN'S EVIDENCE* (a 602[02], at 602-11 (1987).

178. See Section IV.A.2, *supra*.

## B. The Other Objections Issue

*Irrelevancy:*<sup>179</sup> This objection rests on a sound premise: just as "one picture equals a thousand words,"<sup>180</sup> one CGR contains a thousand underlying facts, not all of which may be material. Even if indisputedly accurate, a CGR containing immaterial facts could unduly prejudice the jury, waste the court's time with side issues, and produce unfair results. In short, courts ought to use this objection to exclude immaterial portions of CGRs.

The true problem facing courts and lawyers lies not in debating whether to recognize this objection, but in defining the issues disputed under consideration at trial. A change in the disputed issues could easily alter how much of the CGR the Irrelevancy objection would permit a jury to see.<sup>181</sup>

*Hearsay:*<sup>182</sup> This Comment recommends discarding the traditional prohibition of all Expert Witness CGRs when the expert happens to rely upon out-of-court statements in formulating her accident reconstruction. Both the traditional view and the supposedly liberal Rule 703 would prohibit expert accident reconstruction testimony based upon impermissible hearsay statements.<sup>183</sup> The following arguments demonstrate why a more permissive stance towards this evidence should be adopted.

At first blush, the policy in favor of the traditional view -- that inadmissible hearsay evidence might "sneak in" through the testimony of an expert -- appears to have merit. It seems incongruous to prohibit a jury from hearing an out-of-court statement but allow a jury to hear an expert opinion based upon that same out-of-court statement.

But this rule can work a hardship. For example, it prohibits an appraiser from relying upon an earlier appraiser's valuation of a business

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179. See Section II.B.2.a, *supra*.

180. *Bonito v. Peekskill Ford Motors, Inc.*, 64 A.2d 682, 683, 407 N.Y.S.2d 580, 582 (1978).

181. Assume a driver of a car brings a products liability action against a tire manufacturer, claiming a tire on his car blew out causing the car to swerve across the highway into oncoming traffic. If the proposition in dispute at trial is whether the tire blew out before the swerve or when the car crashed, then a portion of a CGR containing post-crash facts, such as the rollover and fire, is not material to that proposition even if it is perfectly accurate.

On the other hand, those same post-crash facts could prove other propositions that might be in dispute. For example, if the tire manufacturer claims the driver overstated his injuries, then the post-crash facts concerning the violent rollover and fire become material because they help prove the severity of those injuries. Note, though, if the tire manufacturer stipulates as to damages, then the post-crash portion of the CGR again becomes immaterial.

182. See Section II.B.2.b., *supra*.

183. *Id.*

while the business was still viable even though the business is now bankrupt.<sup>184</sup>

Paradoxical results like this in part brought about adoption of the liberal Rule 703 rule.<sup>185</sup> As mentioned above, Rule 703 on its face takes a permissible position regarding expert opinions based on hearsay.<sup>186</sup> As long as the hearsay statements are of "a type reasonably relied on by experts in the particular field" the expert opinion is admissible.<sup>187</sup> But the Advisory Committee Note to the same rule specifically excludes reconstruction testimony of an "accidentologist."<sup>188</sup> A possible justification for this exception appears in *Dallas & Mavis Forwarding Co. v. Stegall*, which stated: "To permit [an eyewitness' out-of-court] opinion to be heard through the testimony of an official would cloak it with an undeserved authority that could unduly sway a jury."<sup>189</sup>

That argument can be criticized on various grounds. First, presumably all expert opinions relying upon hearsay "cloak" the hearsay with "undeserved authority." Yet the advisory committee note gives no reasons for specifically excluding accident reconstruction testimony from the benefits of Rule 703. Second, the Rule 703 exception offers no help in distinguishing reasonable as opposed to unreasonable reliance on hearsay in forming an expert opinion. For example, perhaps the only source for a crucial bit of data concerning an accident is a hearsay statement. It seems harsh to arbitrarily label all use of that scarce data by an expert as "unreasonable." Third, it fails to explain whether hearsay-based accident reconstruction testimony could ever "graduate" into Rule 703 should accident reconstructionists decide, as a professional group, always to rely upon hearsay statements in reaching their expert opinions.

In short, courts faced with the Hearsay objection to an Expert Witness CGR should at least consider these counter-arguments in favor of CGR admissibility and not blindly follow the Advisory Committee Note.<sup>190</sup> However, for the immediate future, both the traditional view<sup>191</sup>

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184. *Taylor v. B. Heller & Co.*, 364 F.2d 608, 613 (6th Cir. 1966).

185. See 3 D. LOUISELL & C. MUELLER, *supra* note 110, § 389, at 655-56 (1979) (restricting experts from relying upon hearsay characterized as an "ultimate futility").

186. See Section II.B.2, *supra*.

187. FED. R. EVID. 703.

188. FED. R. EVID. 703 advisory committee's note.

189. 659 F.2d 721, 722 (6th Cir. 1981), *quoted in* *Faries v. Atlas Truck Body Mfg. Co.*, 797 F.2d 619, 624 (8th Cir. 1986).

190. For a discussion of the Advisory Committee's Note to FED. R. EVID. 703 and how it might act to bar accident reconstruction testimony based upon hearsay, see Section II.B.2.b, *supra*.

191. However, courts are not bound to follow Advisory Committee Notes, although the Notes are considered to be persuasive authority. *E.g.*, *United States v. Ruminer*, 786 F. 2d 381, 386 (10th Cir. 1986).

and the liberal Rule 703 exception clearly mandate exclusion of Expert Witness CGRs that are partially based upon hearsay statements. A lawyer opposing an Expert Witness CGR might succeed in barring it if a thorough cross-examination of the expert reveals hearsay formed a basis of the expert's accident reconstruction.

*Eyewitness Testimony Available:*<sup>192</sup> This Comment recommends that courts not apply this objection to bar the use of a CGR. Few states recognize this objection at all,<sup>193</sup> and there is no indication those states represent an emerging trend in the law. In light of two corollary rules that courts have applied in conjunction with it, the Eyewitness Testimony objection gives the court nearly unlimited exclusionary powers whenever an eyewitness is available. First, an "eyewitness" need not see everything that occurred, for "[i]t is sufficient if they can relate circumstances from which the impact might reasonably be inferred."<sup>194</sup> Second, expert accident reconstruction testimony cannot be used to impeach an otherwise credible eyewitness.<sup>195</sup> Under such restrictions it is difficult to imagine a situation when an Expert Witness CGR would be admissible.

Furthermore, the justification for this objection (and its two corollaries) an expressed preference for eyewitness testimony over reconstruction testimony<sup>196</sup> demonstrates that this objection rests upon a faulty premise. Eyewitness testimony is notoriously unreliable.<sup>197</sup> A properly qualified expert, knowledgeable in physics and mechanical engineering, could probably reconstruct an accident using mathematical principles as accurately as an eyewitness could using memory.

*Non-Authentic:*<sup>198</sup> Courts should recognize this objection only when examining the link between accident reconstruction testimony and its underlying facts. In contrast, courts should not recognize this objection when examining the link between a CGR and its underlying testimony (whether it pertains to an accident reconstruction or an

192. See *supra* notes 72-75 and accompanying text.

193. See, e.g., *Allen Morris Co. v. McNally*, 305 So.2d 79, 80 (Fla. Dist. Ct. App. 1974); *Thomas v. Dad's Root Beer & Canada Dry Bottling Co. of Portland*, 225 Or. 166, 168, 356 P.2d 418, 419 (1960); *But see Hosbein v. Silverstein*, 358 So. 2d 43, 44 (Fla. Dist. Ct. App. 1978), *cert. denied*, 365 S. 2d 71 (Fla. 1978).

194. *Misch v. Meadows Mennonite Home*, 114 Ill. App. 3d 792, 800, 449 N.E.2d 1358, 1363-64 (1983).

195. *Milton v. Britton*, 19 Ill. App. 3d 922, 930, 312 N.E.2d 303, 309 (1974); *Whitman v. Lopatkiewicz*, 152 Ill. App. 3d 332, 338, 504 N.E.2d 243, 247 (1987).

196. *Levin v. Welsh Bros. Motor Svc., Inc.*, 164 Ill. App. 3d 640, 518 N.E.2d 205, 211 (1987).

197. *United States v. Wade*, 388 U.S. 218, 228-29 (1967); N. SOBEL, *EYE-WITNESS IDENTIFICATION: LEGAL AND PRACTICAL PROBLEMS* §§ 1.1-1.2 (rev. ed. 1987).

198. See Section II.B.2.d, *supra*.

eyewitness' recollections) or the link between a CGR and the accident itself.

Concededly, CGRs can easily stray from objective truth. For example, a CGR of a car accident may incorrectly state the paths of the vehicles, the street layout, or the road conditions on the day of the accident.

In that sense, the Non-Authentic objection seems to serve an important purpose: it insures a truthful CGR by asking "does it accurately portray what it purports to represent?" The problems which warrant rejection of this objection arise not from its theoretical basis but from the ways courts might apply it.

If courts examine the accuracy of the link between a CGR and its underlying testimony, then this objection simply duplicates the foundational analysis outlined above. The recommended foundational standard uses a "fair and accurate representation of oral testimony" analysis while this objection uses an "accurately portray" standard. No reason exists to presume courts would draw any meaningful distinction between these two similarly worded standards. Thus, courts should reject use of this objection in this situation because it is redundant.

A more serious problem arises if courts yield to temptation and use the Non-Authentic objection to directly review the link between the CGR and the accident itself. This subverts as well as duplicates the broad purpose of the recommended foundational analysis. As mentioned above, a judge who pre-determines the veracity of a CGR by comparing it directly to the accident invades the province of the jury.<sup>199</sup> In such a case the judge has made a factual determination regarding the credibility of the witness and not a legal determination. It makes no sense to prevent a judge from making such factual determinations as a preliminary foundational matter and then permit the judge to make them via this objection.

On the other hand, a good reason exists for recognizing this objection when examining the link between an accident reconstruction and its underlying facts. The Rule 702 test, which this Comment recommends as the proper foundational standard for this link, examines the propriety of permitting any accident reconstruction testimony.<sup>200</sup> It does not address the propriety of a particular accident reconstruction. This objection fills that void by insuring that the accident reconstruction accurately portrays the underlying physical facts of the particular accident.

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199. See Section IV.A.3, *supra*.

200. See Section IV.A.2, *supra*.

Judges and lawyers must be careful in two respects. First, important facts concerning the accident are sometimes disputed. CGRs should not be barred if they contain disputed facts, but perhaps their existence within the CGR ought to be explained to the jury. Second, accident reconstructions must be distinguished from accident experiments. In contrast to a reconstruction, experiments do not attempt to re-create the accident itself; instead they try to prove some specific proposition associated with the accident.<sup>201</sup> Since testimony<sup>202</sup> concerning accident experiments does not attempt to re-enact the accident, no reason exists to scrutinize it to see if it accurately portrays the underlying facts of the accident. However, the fact the testimony concerns an experiment and not a re-enactment probably should be carefully explained to the jury lest they confuse the two.

*Not a Proper Subject for Expert Testimony (Beyond the Ken):*<sup>203</sup> Courts should reject the use of this objection for the following reasons. First, under this objection an Expert Witness CGR's admissibility could never be predicted ahead of trial.<sup>204</sup> This unpredictability comes about because a court's ruling on this objection would always depend on how broadly the court defines the underlying issue in question.<sup>205</sup>

Second, this objection would waste a court's time by repeating the same test required by the recommended Rule 702 foundational standard. The court must analyze whether the issue is "beyond the ken" (this objection's requirement) of the average juror in addition to whether it

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201. For example, an accident experiment might consist of crashing various cars in to a wall at differing speeds -- e.g., 5, 10, 15, and 20 miles per hour -- to determine the speed which generates the same amount of body deformation suffered by a car in an accident.

202. Note that a computer animation of experiment testimony would not be an Expert Witness CGR. CGRs are re-enactments of accidents, not re-enactments of accident experiments. The evidence problems associated with computer animation of accident experiments is beyond the scope of this Comment.

203. See Section II.B.2.e, *supra*.

204. This is an undesirable situation because it would contribute to higher pre-trial expenses; prudent lawyers will prepare extra witnesses and exhibits to fill the void in their cases created by the barring of the CGR.

205. For example, if a court defines the underlying issue as "who caused the accident?" then virtually no accident reconstruction testimony would ever be admissible because, as drawn, the issue would be always within the "ken" of the average juror. See *Zachery v. Wheeler*, 511 F. Supp. 591, 592-93 (E.D. Tenn. 1981). Indeed, courts empanel juries to decide the very question of "who caused the accident?" On the other hand, if the court defines the issue narrowly -- such as "assuming the pickup truck had almost stopped by the north edge of the highway just before the crash, then, given the weight and probable velocity of the other vehicle, could the pickup truck have come to rest where it was found?" -- the results would probably differ. Now the issue calls for expert testimony in physics and mathematics, which probably meets the "beyond the ken" requirement.

will "assist the trier of fact" (Rule 702's requirement). Although this objection and the Rule 702 standard employ differently worded tests, both examine the relationship between the offered expert testimony and the body of knowledge possessed by the average juror.<sup>206</sup>

*Not a Proper Subject for Expert Testimony (Non-Qualified Expert):* This objection should be recognized by courts. No one can seriously dispute the inappropriateness of a licensed real estate appraiser offering expert testimony regarding how a fire spread in an arson case, or a certified arson investigator with 25 years experience offering expert testimony in an eminent domain case. The Non-Qualified Expert objection would combat such abuses.

However, proponents and opponents of Expert Witness CGRs should realize that since specific rules to guide a court in assessing an expert's qualifications do not exist,<sup>207</sup> the matter lies largely in a court's discretion.<sup>208</sup> In addition, it is often unclear in accident cases which types of experts may or may not qualify to render an opinion.<sup>209</sup>

A lawyer fighting the introduction of an Expert Witness CGR can use this problem to his or her advantage. Careful voir dire of the expert may reveal that the expert's credentials, though extensive, do not quite match the opinion the expert is prepared to give. For example, in a case to determine the cause of an automobile brake failure an Underwriters Laboratory scientist may have conducted hundreds of tests on the flammability of brake pad material but none concerning sudden mechanical brake failure. Thus, the expert may be unqualified to testify on that issue.

*Opinion Embraces Ultimate Issue:*<sup>210</sup> A majority of states no longer recognize this objection<sup>211</sup> and have instead adopted the permissive Rule

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206. This duplication of analysis argument would be invalid should a court adopt one of the other two foundational standards instead of Rule 702. The *Frye* test examines the relationship between the method employed and the scientific community where it belongs while the "substantially similar" test examines the relationship between an accident reconstruction and the accident.

207. *McKiernan v. Caldor, Inc.*, 183 Conn. 164, 168, 438 A.2d 865, 867 (1981) (expert witness must have "reasonable qualifications"); C. MCCORMICK, *supra* note 46, § 13, at 34.

208. *United States v. Lopez*, 543 F.2d 1156, 1157-58 (5th Cir. 1976), *cert. denied*, 429 U.S. 1111 (1977) (credentials of expert testifying regarding defendant's sanity weighed in light of several factors).

209. For example, in a products liability action concerning a failed brake on an automobile, some potential experts might include a brake manufacturer's design engineer, an Underwriters Laboratory scientist, a government safety engineer, or even a professional accident reconstructionist.

210. See Section II.B.2.f, *supra*.

211. See C. MCCORMICK, *supra* note 45, § 12, at 30.

704.<sup>212</sup> In keeping with this trend, this Comment recommends courts reject the use of this objection to bar CGR evidence.

This objection operates against two types of accident reconstruction testimony: i) expert opinion testimony containing blatant declarations of how the case should be decided; and ii) expert opinion testimony concerning important, decisive issues in the case. This objection cannot justifiably be used against either of them.

The first type of expert opinion testimony, the blatant declaration of fault, can be barred through the use of the More Prejudicial than Probative objection, which courts should recognize.<sup>213</sup> A blatant declaration of fault certainly has very little, if any, probative value. Furthermore, such a statement, almost by definition, creates unfair prejudice in the minds of the jury. Thus, in this situation the Opinion Embraces Ultimate Issue objection serves no useful purpose.

As far as expert opinion testimony of the second type, this objection works to bar virtually every Expert Witness CGR.<sup>214</sup> The ultimate issue in accident cases almost always involves determining what happened during the accident and apportioning fault accordingly. Since expert accident reconstruction testimony attempts to re-enact what happened in the accident, it always embraces the ultimate issue of fault. Otherwise the expert opinion testimony would be irrelevant.

*More Prejudicial Than Probative.*<sup>215</sup> Courts should recognize the application of this objection to both Expert Witness CGRs and Eyewitness CGRs. CGRs harbor numerous possibilities for the "unfair" emotional appeal. The dismemberment of a body or the burning of human tissue can be simulated. Subtle psychological use of color<sup>216</sup> or music<sup>217</sup> can be employed. The speed and paths of objects can be distorted. Important details can be modified or omitted -- such as the location of streetlights around a street intersection.

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212. See FED. R. EVID. 704 advisory committee's note.

213. See the following section for a discussion of the More Prejudicial than Probative objection.

214. In such situations it is likely no expert opinion testimony whatsoever would ever be admissible, not merely expert accident reconstruction testimony that results in an Expert Witness CGR.

215. See Section II.B.2.g, *supra*.

216. For example, if the defendant in a car accident case claims the plaintiff's car was unnoticeable until too late, the plaintiff's CGR might "paint" the plaintiff's car a bright color such as red.

217. See *Wilson v. Piper Aircraft Corp.*, 282 Or. 61, 77, 577 P.2d 1322, 1331 (1978) (en banc) (liberal use of music to make dramatic points in motion picture impermissible), *reh'g denied*, 282 Or. 411, 579 P.2d 1287 (1978).

An Expert Witness CGR or Eyewitness CGR might communicate unwarranted -- and therefore, unfair -- messages to the jury. This objection would guard against such misuse.

*Cumulative.*<sup>218</sup> Courts should exercise great reluctance in excluding a CGR on the basis of cumulateness (i.e., that it merely repeats the witness' underlying oral testimony). Although no case law for or against this objection being applied to CGRs exists, the following policy arguments militate against its widespread use. First, the Cumulative objection ignores the peculiar ability of CGRs to convey information in a way that ordinary oral testimony cannot.<sup>219</sup> In that sense a CGR, though tracking a witness' testimony, does not duplicate it. Second, a CGR may be cumulative on one issue but not on another.<sup>220</sup> Third, "[o]ne witness is good, but two or three will make [a] case much stronger, even though all will testify in a similar vein."<sup>221</sup> In other words, a lot of cumulateness is impermissible, but a little might be permissible.<sup>222</sup>

### C. The Jury Room Issue

A lawyer who manages to lock a CGR in the same room with a jury possesses a great advantage over his or her opponent because the jury could replay the CGR -- in essence the lawyer's preferred version of the accident -- over and over again.<sup>223</sup> This Comment argues that CGRs should not be allowed into the jury room.

Proponents of CGRs, who may have spent large amounts of money to prepare and produce their CGRs, would probably argue against such a result. They would argue it makes no sense to distinguish CGRs from other admitted evidence that is routinely allowed into the jury

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218. See Section II.B.2.h, *supra*.

219. See *State v. Strandy*, 49 Wash. App. 537, 745 P.2d 43, 46 (1987) (although an oral description might suffice, "a photograph or videotape can help make a witness' description more understandable").

220. D. LOUISELL & C. MUELLER, *supra* note 110, § 128, at 41 ("care must be taken *not* to exclude merely because of an *overlap*") (emphasis in original).

221. *Id.* at 42.

222. Courts considering excluding a CGR because of cumulateness should realize that the *Hopperstad* case, cited as a theoretical case law basis for this objection in Section II.B.2.h, *supra*, may carry less precedential force than apparent on first blush. The court employed reasoning suggesting the barred videotaped re-enactment may have been permissible had the prosecution presented fewer witnesses. *State v. Hopperstad*, 367 N.W.2d 546, 549 (Minn. Ct. App. 1985).

223. See Section III.C, *supra*. Apparently seeing is believing even for lawyers *outside* of court. See Letter from John R. McCall to Robert Seltzer of Graphic Evidence (Feb. 6, 1984) (multi-million dollar settlement generated by showing a CGR to opponents).

room.<sup>224</sup> This is because the jury may need to refresh its recollection of certain evidence heard or seen during the trial, whether the evidence is a faulty tire or a CGR. This general justification certainly applies to CGRs.

However, the following two counter-arguments militate against allowing CGRs into the jury room. First, according to case law and statutory authority, the issue here centers on whether to characterize CGR evidence as "admissible evidence" (thus allowed into the jury room), or as a "testimonial aid" or having a "solely testimonial character" (thus barred from the jury room).<sup>225</sup> Of those categories, CGRs most closely resemble the latter two, and thus should be barred. For example, an Expert Witness CGR, like the mockup pipe bombs used as testimonial aids in *Cox*,<sup>226</sup> is simply a way for an expert witness to better tell a jury his opinion as to how things might have been.

Further, because both Expert Witness CGRs and Eyewitness CGRs amount to nothing more than an animated version of a witness' testimony, the analogy between the *Chambers*<sup>227</sup> testimonial evidence<sup>228</sup> and CGRs appears clear. In both situations a great danger exists that a deliberating jury will repeat one witness' testimony over and over again simply because a party "was clever enough to record that . . . testimony on videotape."<sup>229</sup> In this sense, the videotape in *Chambers* can be distinguished from the videotape in *Strandy*<sup>230</sup> -- which was characterized as admissible evidence. The *Chambers* videotape contained an interview of the victim concerning the events surrounding the crime,<sup>231</sup> and thus involved a question of credibility. The *Strandy* videotape, on the other hand, confined itself to physical reality: the layout of the crime scene.<sup>232</sup> CGRs more closely resemble the *Chambers* videotape because they synopsise events, and not the simple objective facts found in the *Strandy* videotape.

Second, regardless of the outcome of the characterization process, CGRs should not be allowed into the jury room as a matter of sound

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224. *E.g.*, *State v. Johnson*, 118 Wis. 2d 472, 478-81, 348 N.W.2d 196, 199-201 (Ct. App. 1984) (photographs should have gone into jury room); *State v. Zobel*, 81 S.D. 260, 279, 134 N.W.2d 101, 112 (1965) (colored slides and slide projector allowed into jury room), *cert. denied*, 382 U.S. 833 (1965).

225. *See* Section II.C, *supra*.

226. *United States v. Cox*, 633 F.2d 871 (9th Cir. 1980), *cert. denied*, 454 U.S. 844 (1981).

227. *Chambers v. State*, 726 P.2d 1269 (Wyo. 1986) (out-of-court videotape interview of crime victim).

228. *See* Section II.C, *supra*.

229. 726 P.2d at 1276.

230. *State v. Strandy*, 49 Wash. App. 537, 745 P.2d 43 (1987).

231. *Chambers*, 726 P.2d at 1271.

232. *Strandy*, 745 P.2d at 46.

judicial policy. CGRs present a powerful and sometimes dramatic distillation of a witness' testimony. Giving juries the ability to repeat that witness' testimony but denying the same privilege to a different witness' testimony invites the jury to place undue emphasis -- and therefore unfair emphasis -- on the repeatable testimony while discounting the other.

Furthermore, CGRs differ fundamentally from physical evidence in their psychological impact on a jury. A piece of physical evidence in an accident case represents a small, finite portion of the universe of facts constituting an accident. A jury could look at that physical evidence a hundred times and still not "see" the accident in their minds. A CGR, on the other hand, attempts to re-enact the entire accident. When jury members see a CGR, they have witnessed *an* accident<sup>233</sup> occur with their own eyes just the way the CGR proponent claims *the* accident happened. This gives added subconscious credibility to the CGR proponent's version; the jury now knows the proponent's version is not a total impossibility because they witnessed one just like it. Allowing CGRs into the jury room would only reinforce that impression and jeopardize the jury's ability to separate fact from fiction.

## V. CONCLUSIONS AND PREDICTIONS

As for the future, CGRs will appear more and more in courtrooms. One reason will be that CGRs will cost less in the future as computational power in general goes down in price and as more CGR designers enter the business. Another reason will be that more lawyers will begin to realize the power of CGRs to induce settlements and win trials.

CGRs constitute an interesting form of evidence. Numerous adjectives could apply to them: educational, informative, innovative, dangerous, misleading, and prejudicial. Such a disparate nature counsels caution for courts determining the admissibility of a CGR. This Comment concludes that courts should weigh a CGR's admissibility by employing a simple analytical framework<sup>234</sup> and appropriate foundational standards.<sup>235</sup> In addition, this Comment gives guidance to courts on how to handle various objections that may be raised against CGRs at trial. Finally, this Comment concludes that CGRs, if admitted into evidence, should not be brought into the jury room during deliberations

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233. See *supra* note 9.

234. The framework can be summed up as follows: for Expert Witness CGRs, preliminarily determine the admissibility of underlying accident reconstruction testimony; then, for both Expert Witness CGRs and Eyewitness CGRs, determine the admissibility of the CGR itself.

235. Courts should employ the Rule 702 standard for underlying expert accident reconstruction testimony and the "fair representation of oral testimony" standard for the CGR itself.

because juries might give them too much emphasis by replaying them over and over.

Of course, it is naive to assume that CGRs which survive the analysis proposed by this Comment would be perfectly non-partisan. But partisanship should not be grounds for rejection of CGRs; the same charge could be leveled against any testimony. CGRs should not be singled out for exclusion simply because they can present testimony more effectively than other, equally partisan means of introducing evidence.