October 13, 1980

Accident Analysis Report

Submitted to:

Mr. Peter P. Zawaly, Jr.
Vogelgesang, Howes, Lindamood, Zawaly & Brunn
424 Citizens Savings Building
P.O. Box 870
Canton, Ohio 44701

Re: Knell v. Tolin
Your File No. 79-7-20

Materials Reviewed:

1. Items labelled Defendant's Deposition Exhibits A-J
   - A - Reconstruction Summary
   - B - State of Ohio Traffic Crash Report 79-22283 (dated 06-08-79) and other information
   - C - Calculations
   - D - Statement of Mrs. J. Peiser
   - E - Auto Dimensions
   - F - Signal light information
   - G - Notes
   - H-J - Copies of engineering drawings
2. Deposition of the Plaintiff Morris L. Knell
3. Deposition of the Defendant James J. Tolin
4. Deposition of Simon Tammy
5. Photographs of the accident scene and of the vehicles which were involved.

Results and Conclusions

1. Position of the cars at impact.

The following facts indicate that at impact the direction of each vehicle was very nearly south and parallel to the north-south direction of Market Ave.

a. The post-impact skid of vehicle #1 (Knall) is parallel to the north-south direction of Market Ave.
b. The pre-impact skid of vehicle #2 (Tolin) is parallel to the north-south direction of Market Ave.

c. The damage to each vehicle shows that the impact force was directed nearly parallel to the long dimension of each vehicle.

Further, the position of the skidmarks and the cars after impact show that each vehicle was completely in the southbound passing lane of Market Ave. at impact.

2. The speed of vehicle #2 (Tolin) at the point where its 8' 10" pre-impact skid began.

To calculate the pre-skid speed of the Tolin car the following information was used.

a. The weight of each vehicle including a driver is very nearly 4000 lbs (See exhibit B).
b. At impact the right rear wheel of vehicle #1 (Knell) locked (See photos and exhibit G) and left a 46'10" straight skid after impact. This fact suggests that only the weight on this wheel was effective in slowing #1 after impact.
c. From the resting position of vehicle #2 (Tolin) after impact as per the police report and the dimensions of a 1977 Chevrolet Impala (See exhibit E), one can show that the angle of rotation of vehicle #2 due to the impact was approximately 20-23° west. The rotation was about the left front (point of contact) of vehicle #2.
d. The pre-impact skid of vehicle #2 (Tolin) was 8'10" long according to the police report. There is no evidence to suggest that all the wheels were not effective in slowing the vehicle during this skid.
e. The coefficient of friction for rubber tires skidding and sliding on dry traveled asphalt is in the range 0.60 - 0.80 for vehicles traveling less than 30 mph. (Traffic Accident Investigation Manual, Northwestern Traffic Institute)

The steps of the analysis are as follows:

I. The speed of vehicle #1 (Knell) immediately after impact is determined by equating its kinetic energy at this instant to the work done by the frictional force on the right rear tire to bring it to a stop. The result is that Vehicle #1's speed just after impact was in the range 14.5 - 16.7 mph.

II. The effective linear speed of vehicle #2 (Tolin) just after impact can be determined by equating the work required to rotate the vehicle 20-23° against

the frictional force between the tires and the pavement. Here the pivot point is the left front of the vehicle. This work is equal to the product of the torque exerted against the frictional force on the tires times the angle of rotation (in radians). The result is in the range of 7002 -10368 ft.lbs. Upon equating this work to a post-impact kinetic energy for #2, a post-impact speed range of 7.2 - 8.8 mph is obtained.

III. The application of the principle of conservation of momentum at impact results in a pre-impact speed range of 21.7 - 25.5 mph for vehicle #2 (Tolin) - - only if vehicle #1 (Knell) was stationary at impact. If Knell was traveling 10 mph at impact then Tolin's impact speed would be reduced by 10 mph and be in the range 11.7 - 15.5 mph.

IV. The use of the work-energy theorem for the pre-impact skid of 8'10" yields the speed range for the Tolin car just before the skid began as 17.2 - 29.4 mph. This range takes into account that the pre-impact speed of vehicle #1 is between zero and 10 mph.

3. The path of vehicle #1 (Knell) prior to impact.

None of the physical evidence in this case can show whether or not vehicle #1 crossed the double center line of Market Ave. as it proceeded from a stopped position at the light on Market Ave. at the north edge of 55th Street to impact. The physical data allow only for the calculation of the pre-impact speed of vehicle #2 (Tolin) and the location and direction of the vehicles at impact.

According to Defendant's deposition B-12, however, the distance from the north edge of 55th Street to the front of vehicle #1 at impact is 179.3'. Certainly, a southbound car traveling at a relatively low speed from a standing stop could have maneuvered so as to completely cross the double center line into the northbound turning lane and to cross back into his own proper southbound lane in this distance. Even from the south edge of 55th a car would have about 105' which is an adequate distance within which to negotiate this maneuver. Furthermore, at a relatively low speed the maneuver would not even be

rushed. At an average speed of 5 mph it would take 24.4 seconds to travel the 179.3' and 14.3 seconds to travel 105'. Thus both the times and the distances are compatible with completing the maneuver. They are also compatible, however, with a car traveling straight south without ever crossing the center double line.

Report Submitted by:

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