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The Honorable Hollis Hill
SUPERIOR COURT CLERK

E-FILED

CASE NUMBER: 10-2-20999-9 KNT

SUPERIOR COURT OF WASHINGTON IN AND FOR KING COUNTY

JAMES H. OSBORNE and DIANE B.
OSBORNE, husband and wife, KEVIN S.
OSBORNE, a single person, and DIANE B.
OSBORNE, as Guardian ad Litem for the
minor child A.R.O.,

Plaintiffs,

v.

RECREATIONAL EQUIPMENT, INC., d/b/a
REI, a Washington corporation, FAIRLY BIKE
MANUFACTURING CO., LTD., a foreign
corporation, GRUPPO S.p.A., a foreign
corporation, Giant bicycle, Inc., a foreign
corporation, MAVIC SAS, a foreign
corporation, FUNG TIEN ELECTRIC CO.,
LTD., a foreign corporation, ABC, a business
entity, DEF, a business entity, and GHI, a
business entity,

Defendants.

NO. 10-2-20999-9 KNT

DECLARATION OF GERALD
BRETTEING, P.E.

I, Gerald Bretteing, declare as follows:

1. I am over the age of 18, competent to testify, and make this declaration from my
own personal knowledge.

2. I am a Professional Engineer licensed in the State of California. I earned a
Bachelor of Science in Mechanical Engineering from the University of California at Los Angeles
in 1979. I have raced bicycles in the United States Cycling Federation and have extensive
experience in the areas of bicycle design and defects, accident reconstruction, and the interaction

DECLARATION OF GERALD BRETTEING - 1

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1 between the bicycle rider, the bicycle and the surrounding environment. I have taught multiple
2 courses regarding bicycle accident reconstruction and am lead author of the article "Analysis of
3 Bicycle Pitch-Over in a Controlled Environment" published in SAE 2010-01-0064 (April 12,
4 2010). A copy of my CV is attached hereto.

5 3. Recreational Equipment, Inc. ("REI") has asked me to look at the simulation
6 prepared by Jon Jacobson using the PC Crash program in the above-captioned matter. The
7 simulation created by Dr. Jacobson contains numerous dissimilarities with the subject bicycle
8 and rider. Certain of these dissimilarities are material such that the results are in my opinion
9 entirely inaccurate and unreliable. The dissimilarities are as follows:

10 a. PC Crash offers a model for a bicycle. Nonetheless, Dr. Jacobson used a
11 model for a motorcycle. By using the motorcycle model instead of the bicycle model there are
12 differences, for example, in the suspension. Dr. Jacobson used the motorcycle defaults for
13 stiffness and damping of the suspension. Since the subject bicycle does not have suspension,
14 these figures for the subject bicycle would in fact be much higher. Also, Dr. Jacobson did not
15 turn off the ABS feature on the motorcycle model. Differences in the dimensions between the
16 PC Crash model and Mr. Osborne's bicycle are listed in the table below.

	PC Crash Model (Motorcycle)	Subject Bicycle
Overall length	98.43 inches	65.9 inches
Overall height	29.3 inches	39.7
Front overhang	15.75 inches	13.38 inches
Wheelbase	42 inches	39 inches
Weight of bicycle with rider and gear	180 pounds	198 pounds
Distance of center of gravity from front hub of the bicycle	29.53 inches	22.1 inches
Center of gravity height above ground	33 inches	41.7 inches
Wheel diameter	.1 inches	26.75 inches

24 b. Dr. Jacobson's figures for the wheelbase, distance of the center of gravity
25 from the front of the bicycle, and center of gravity height from the ground materially affect the
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DECLARATION OF GERALD BRETTING - 2

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1 outcome of the simulation. If Dr. Jacobson had used the proper dimensions for these parameters,
2 the result would be that the bicycle in his simulation would pitch-over if the frame did not
3 fracture.

4 i. Dr. Jacobson used a wheelbase (the distance between the bicycle
5 hubs) of 42 inches for his PC Crash model. The actual wheelbase of the subject bicycle was 39
6 inches. With all other factors being equal, a bicycle with a shorter wheelbase is more likely to
7 pitch-over than a bicycle with a longer wheelbase.

8 ii. Both the wheelbase and the distance the center of gravity is located
9 behind the front hub effect the front to rear wheel weight distribution on the bicycle. Using Dr.
10 Jacobson's wheelbase of 42 inches and distance the center of gravity is behind the front axle of
11 29.53 inches, the load distribution on his PC-Crash model was 70% on the rear wheel of the
12 bicycle and 30% on the front wheel of the bicycle. This is a significant amount of increased
13 weight on the back of the model motorcycle. This weight distribution counters the forces on the
14 front tire that cause the bicycle to pitch-over, making the bicycle more difficult to pitch-over. On
15 the other hand, using the appropriate dimensions for these parameters, the load distribution
16 would be 56% on the rear wheel and 44% on the front wheel. In other words, during the subject
17 accident there would have been significantly less weight counteracting the forces on the front tire
18 than in Dr. Jacobson's PC Crash model. Had Dr. Jacobson left all other parameters the same but
19 used the appropriate distance for the center of gravity behind the front hub of the subject bicycle,
20 his PC-Crash simulation would have resulted in a pitch-over. Moving the center of gravity
21 forward by any distance greater than 1.0 inches and keeping all other parameters of Dr.
22 Jacobson's PC-Crash model the same would result in pitch-over of his simulation.

23 iii. The center of gravity height above the ground also materially
24 affects whether a bicycle will pitch-over in the event of the front wheel suddenly stopping. The
25 higher the center of gravity, the more likely it is that the bicycle will pitch-over. The center of
26 gravity height above the ground on a bicycle is located above and forward of the nose of the

DECLARATION OF GERALD BRETTING - 3

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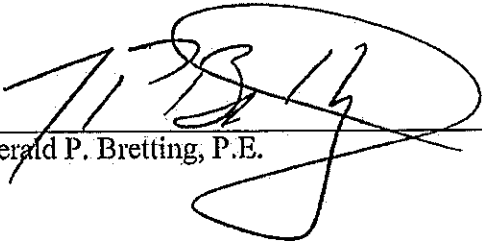
1 saddle. Dr. Jacobson uses 33 inches for this parameter which would be lower than the height of
2 the saddle on Mr. Osborne's bicycle and is therefore well below where Mr. Osborne's center of
3 gravity would be. Had Dr. Jacobson left all other factors the same but used the appropriate
4 center of gravity height from the ground for the subject bicycle and rider, his PC-Crash
5 simulation would have resulted in a pitch-over. Moving the center of gravity upward by any
6 distance greater than 2.0 inches and keeping all other parameters of Dr. Jacobson's PC-Crash
7 model the same would result in pitch-over of his simulation.

8 c. The subject accident involved a stick getting caught in the front wheel.
9 However, instead of using a stick in his simulation, Dr. Jacobson used braking which he limits to
10 0.58 g's. Due to the upward acceleration of the bicycle and rider during a sudden deceleration
11 event, a stick in the front wheel would cause a much higher deceleration, up to 3.6 g's.

12 d. In short, it is my opinion that Dr. Jacobson's PC Crash motorcycle model
13 is materially different from the subject bicycle and the subject accident. Such a model cannot be
14 reasonably relied upon in the field of accident reconstruction of a bicycle pitch-over event.

15
16 I declare under penalty of perjury under the laws of the State of Washington that the
17 foregoing is true and correct.

18 EXECUTED this 10th day of April, 2012, at El Segundo, California.

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22 Gerald P. Bretting, P.E.
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DECLARATION OF GERALD BRETTING - 4

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