
Zapruder Camera

Autor:

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Memorandum

Re: The Setting of Zapruder's camera and FBI Agent Barrett's report

On page 184 of Harold Weisberg's book, "Whitewash II: The FBI-Secret Service Coverup (Hyattstown, Md. : Harold Weisberg, 1966) is published the FBI report of Agent Robert M. Barrett, dated 12/4/63, of an interview with Abraham Zapruder. The report contains the following statements: "He stated his camera was fully wound, was set, manually, on maximum zoom-lens. The camera was set

speed movie film or 24 frames per second." (emphasis

- added).

Lyndal Haneefelt testifies (5H160) that Zapruder's camera.

was clocked, in the FBI lab, at 18.3 frames per second.

Mr. Zapruder's camera

Dr. O. J. Thompson's research indicates that it didn't even have

a 24 frame per second speed. In his book, "Six Seconds in Dallas"

(New York: Bernard Gels Associates, 1967) he states (page 16):

"On December 8 we learned from Mr. Jones, Bell & Howell's

public relations director, that Zapruder's camera had four settings :

(1) "Single Frame" (2) "stop," (3) "Run"— set at the factory

at 18 frames per second— and (4) "slow motion"— 48 frames per

second. Mr. Jones also told us that the Bell & Howell Company checked

the speed of the camera and found it to run within .1 second of

the FBI-determined 18.3 frames per second."

In view of the fact that Zapruder's camera had no 24 frames/second setting, and in view of the fact that both the FBI AND Bell & Sowell each tested the camera and found that it ran at 18.3 frames/second, the question remains as to how FBI agent Barrett came to write the confusing and erroneous statements that appear in his report.

The purpose of this memorandum is to show that this probably came about because FBI agent Earnest confused camera speed with film speed.

The author in no way condones the fact that the Commission did not publish the Barrett report, or deal with the information therein, which apparently contradicts Shanoyfelt's testimony regarding the Zapruder camera speed. The purpose of this memo is to explain, in the clearest and simplest way, what the author thinks are those technicalities which confused Barrett in his interview with Zapruder.

At the end of the memo, we deal with the fact that a certain reenactment film ran "30 % faster" than the Zapruder film, a point also stressed by Mr. Welsberg.

Here are the various points involved in the explanation referred to above.

(1) There is film speed and there is camera speed. They are different entities, to wit:

a) Camera speed tells you how many frames per second a motion picture camera is exposing. This refers to the actual mechanical speed of the motion picture camera, and does NOT apply to still cameras. It is a parameter that applies to movie cameras, only.

b) Film speed has to do with the light-sensitive properties of photographic film (both movie film, and still film.)

There is "fast film" and there is "slow film". If you were taking pictures in a brightly lit room, indoors, you would need to use film that was more sensitive to light than if you were taking pictures outdoors, in bright sunlight. Therefore, you might want to use "faster" film.

Thus, there is FAST film and SLOW film. This is quite different from whether a particular moving picture camera runs FAST or SLOW.

(2) The parameter that is a measure of a film's "film speed" is its "ASA number". This is called its "ASA rating", or its "ASA number", or simply, its "film speed".

(3) It is a fact that Kodachrome Daylight Type II film has an ASA number of 25. (See Memorandum Exhibit 2)

(^) It is also a fact that Kodachrome Type Ha film, a film

used for indoor photography, has an A.S.A. number of 400
(See Memorandum Exhibit 2)

(5) Kodachrome Type IIA film is a film designed for indoor use. That is why it has a higher A.S.A. number. It is more sensitive to light; this is what makes it an indoor film. This indoor film can

be used outdoors, when an appropriate (salmon colored) filter is put in place over the lens of the camera. (This can be done manually, or a control can be operated on the camera which inserts such a filter in front of the lens, if the photographer has indoor (ASA 40) film in the camera, but is taking pictures outdoors.)

(6) In taking pictures, one uses a light meter to determine the proper lens opening. One points the light meter at the scene

to be photographed, takes a reading, and sets the lens on the camera accordingly. The lens opening is read on a scale of the light meter.

(7) The lens opening determines how much light will pass through

the film inside the camera. It is a fact that, for given lighting, there would be different satisfactory lens openings, depending on the light-sensitive properties of the film that is inside the camera. The needle of the photocell of the light-meter swings out to a certain point, depending upon the illumination. But the light meter does not know what type of film is in the camera. This is information that must be "told" to the light meter. This is why light meters have a variety of different "scales" which can be read.

The scale chosen on the light meter (the scale on which one reads the lens opening) is determined by the film used. Specifically, it is determined by the film speed, or the "ASA number".

Many light meters are designed so that one turns a knob which causes all but one scale to be masked off. An instruction sheet tells the user of the light meter which scale he should be using for different ASA numbers of the various films.

Choosing the scale on the light meter is equivalent to telling the light meter what type of film is in the camera (is: what ASA number). With that information, the light meter then can give the correct lens opening for the scene at which it is pointed.

(8) Electronic cameras

In electronic cameras, the light meter function is incorporated directly into the camera itself. When one points the camera at a scene to be filmed, an electric eye photocell sets the lens of the camera to let the proper amount of light fall on the film.

Again, for given lighting intensity, different lens openings would be required depending on the type of film (ie: film speed) that is being used. In other words, different lens openings would be required, for given lighting, depending on the ASA number of

the film inside the electric eye camera.

Just as the user of a light meter has to know which scale to read (depending on the ASA number of the film being used), so the electric eye mechanism of an electric eye camera has to be told the ASA number of the film inside the camera, so that it can set the lens correctly.

Therefore, electric eye cameras have a knob, associated with the electric eye mechanism, which one turns to the film speed number of the film being used inside the electric eye camera.

This is distinct from (and not to be confused with) the knob one turns to set the mechanical speed at which the camera runs (in frames per second).

Electric eye cameras which run at more than one speed will have BOTH knobs— one for film speed, one for camera speed.

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(See Memorandum Exhibit 2; Not a "film speed dial" on top of camera on page 8 of the instruction- booklet that is reproduced there. This camera does not run at different camera speeds, and so has no "camera speed" knob. This is a Keystone K 810 instruction booklet. Orville Nix was using this type of camera.)

(9) Non electric eye cameras only have a camera speed, on the camera.

In this case, the photographer is aware of the fact that he has

set his lens for the given light (and film speed) when he uses his light meter, and reads that scale designed to give lens openings for the particular film speed involved.

(10) Consider, for the moment, the Nix camera.

Shanoyfelt testifies (5 H 160): "The Nix and Muchmore cameras • were both found (to run) around 18.5 frames per second. "

Whereas Robert M. Barrett interviewed Zaprudor, the FBI sent out Joo Bo Abernathy to interview Orville Nix. His report of the interview is dated 12/2/63, and is published as Commission Exhibit No. 2109 (24 H 539). (See Memorandum Exhibit 1).

FBI Agent Abernathy writes; " Nix further advised that the camera speed with which he took the above movie was believed to be 40 frames per second. He was using a Keystone 'Zoom lens, 8 millimeter camera and had the speed set on normal. It was also set on automatic eye." (Emphasis added.)

(11) If true, the above report would be much worse for the Commission's case than the Barrett report. After all, the difference between

18 and 24 frames per second is "only" 33%. The difference

between 18 frames per second and 40 frames per second is about 130/]

At 40 frames per second, the elapsed time between frame 210 and

frames 313, for example, would be only 2.58 seconds. At that camera speed

of 40 frames per second, the 2.3-second firing time of the rifle would be 92 film frames. Thus, the entire assassination would be over in 2.58 seconds, and

the "4.2 frame. constraint" would now become a gigantic "92 frame constraint".

The Carcano operator would barely be able to operate the bolt once before frame 313 rolled around, and all shots had been fired!

Therefore, if you want to cite obstacles to the Commission's case, the place to start is with the published Abernathy report — which boosts the speed of the assassination 130% — not the unpublished Barrett report, which "only" boosts the speed by 30%.

We now have the thoroughly mixed up situation in which Shanoyfelt, Abernathy, and Barrett all give mutually inconsistent camera speeds.

The time between frame 210 and frame 313 is ::

a) 5.6 seconds (Shanoyfelt, using Zapruder camera at 18.3)
(Shanoyfelt, using Nix camera at 18.5)

b) 4.3 seconds (Barrett, using Zapruder camera at 24)

c) 2.58 seconds (Abernathy, using Nix camera at 40)

What is really amazing is Specter's total equanimity in the

face of two FBI reports which contradicted Lyndal Shanoyfelt's testimony regarding the camera speeds.

(12) Apparently, Abernathy had second thoughts about his FBI report of December 2, 1963, with its galloping camera speed of FORTY frames per second. Besides, if Abernathy contacted the Keystone people, he would find that their popular Zoom lens camera with the electric eye, the model K 810, only runs at 16 frames per second and at NO OTHER SPEED. (See Memorandum Exhibit 2 and 3. There is only one operating position shown on page 9.

This is "run". A factory report told me this is factory set at 16 frames per second. Furthermore, note that there is no other control on the camera to set at any other camera speeds.)

Therefore, Abernathy went back and interviewed Nix again.

This report is dated 1/29/64. It is CS 2110.(24 H 539). (See Memorandum

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Exhibit 1).

This report states two facts that are important.

a) Camera type and model;

...Keystone Auto Zoom, Model K-810, 8 mm movie camera..."

b) The type of film used:

In addition to information previously furnished by him on December 1, 1963, he said the setting was at 40 and he was using the zoom lens with Type A film when he photographed the Presidential Motorcade in Dallas on November 22, 1963." (Emphasis added.)

It is interesting to note that Abernathy actually goes to the trouble of protecting himself by using language that suggests that Nix "withheld" information at their first interview.

So much for the psychology of FBI agents.

(13) From the Keystone K-810 instruction booklet, we learn that:

a) Type A film has an ASA number of 40 (see page 8 reproduced in Memorandum Exhibit 2) -

b) Built into the camera is an A.S.A. Film Speed Dial. This dial enables you to set the "Electric Eye" to agree with the speed of the film to be used in the camera."

(See page 8 of booklet, Memorandum Exhibit 2)

c) The camera comes equipped with a filter so that indoor film (ASA 40, "Type A" film) can be used outdoors. The booklet says (see page 8, Memorandum Exhibit 2):

"When using indoor film outdoors move the filter lever to "TYPE A" position..."

(If Tungsten film is in the camera, one would then set the ASA film dial on 40).

(14) A perfectly reasonable explanation of Abernathy's first FBI report is that he confused film speed and camera speed.

If he is not a photo-bug, this would be an extremely simple thing

for him to have done - But it was not

shows .

he would have to set the film speed dial at 40, if it was a tungsten film, as the chart on page 8 of the instruction booklet -An FBI agent who is not up on these things could easily think Fix meant Ms camera was running at 40 frames per second, which would, be extremely slow motion .

(li) Wo finally come to the Barrett report. Barrett, reaeber, states that Zapruder's camera was running at 24 frames per second*

Or does he? His exact wording is:

The camera was set to take normal speed movie film or 24 frames per second."

Zapruder was using ordinary outdoor film (Kodachrome Daylight Type II) Such film has an ASA number of 25,

It is, perfectly reasonable that Barrett made a similar mistake as | Abernathy , and mistook film speed for camera speed 0 If this is the cause of Barrett's error, then he compounded it a bit by also changing 25 to 24* (And 24 'is, at least, a very common camera speed on SOME cameras, though it is not on Zapruder's.)

(le' In summary, Nix's camera only runs at camera factory speed.

That speed is 16 frames per second.

Nix was using indoor type A film, which has an ASA number of 40.

Abernathy reported Nix's camera speed as 40 frames per second in his first report.

Zapruder's camera runs at only 18 frames per second, and at 48 frames per second. Zapruder was using outdoor film that has an ASA film speed number of 25,

Nix)
Each

Barrett reported his camera speed at 24 frames per second.

It is the author's opinion that both Abernathy (in the case of and Barrett (in the case of Zapruder) made similar errors, confused film speed with camera speed. (And Barrett subtracted

one digit, so that at least the number would agree with a commonly used camera speed.)

In Shaneyfelt's testimony appears the following :

"I found, in examining the film, that this (the time span between 222 and 313 on a reenactment film) is a shorter span of time than in the actual (Zapruder) film. It is a span on the reenactment of about three and a half seconds between 222 and 313..." (5H176)

At 18.3 frames per second, the elapsed time for the 91 frames between 222 and 313 on the Zapruder film is 4.97 seconds.

How much significance can we attach to Shaneyfelt's admission that the reenactment film takes 3.5 seconds to do what Zapruder's film does in 4.97 seconds!

Weisberg notes that this type of error would be consistent with Barrett's 24 frames per second. But it would be "consistent with a whole lot of other error-introducing factors, too.

I don't think that the two are related. Note that there is an independent explanation for Barrett and Abernathy's report, if they are in error.

Assuming they are both in error, then that still leaves the question unanswered as to why the FBI reenactment is off by this amount.

It is important to realize that although 3.5 and 4.97 seconds may differ by 30%, the fact remains that we are dealing with an absolute time segment here of 1.4 seconds. Any of the following factors might account for this:

1) The FBI's location of "frame 210" or some other important marker frame, is off by a few feet. (11 mph is 16.1 feet per second.

This means that errors causing a shortening of distances totaling 16.1 feet would be required to account for a one second error in elapsed time IF the car runs exactly at 11 mph.)

2) The FBI's car may not have been going at exactly 11 mph.

3) Reenactment camera speed may not have been exact. Or* additionally, the projection speed might be off.

Although all this should have been investigated and accounted for,

I don't think the situation justifies relating this issue to the question of Barrett's report.

Barrett's report is provably false, simply because it is physically impossible for Zapruder's camera to run at that speed.

To attempt, in the light of this, to relate the 30% error that WOULD HAVE RESULTED, HAD IT BEEN TRUE, to a 30% error that apparently exists in the reenactment film, comes dangerously close to being sheer numerology. There is no logical relationship there.

Only if the Barrett Report had stood up would it be possible to argue that it might be the answer to the 30% reenactment

discrepancy. But it doesn't, so we have no right to consider it in that light.

David S. Lifton
December 12, 1967

11818# Dorothy St.,
Los Angeles, Calif., 9004 S

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Memorandum Exhibit 1

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8mm color or black

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Your "Electric Eye" is designed for use with
and white film

F !l ' in, ° th f camera is an A.S.A. Film Speed Dial. This dial enable!
t Y OU ,0 , Se . t t h L e "E-ectric Eye" to agree with the speed of the film to
| os used in the camera.

It is important to remember to set the dial to agree with the A.S.A.
number of the film to be used in the camera. When using indoor
film outdoors move the filter lever to "TYPE A" position and set
A.S.A. Film Index Dial to A.S.A. 25 for Kodachrome, Type HA.
Example: If using A.S.A. 25 (outdoor Kodachrome Type II) set the
dial so that the marking adjacent to the number 25 lines up with the
white dot on the top of the camera.

The A.S.A. Film Index Dial can be set between the numbers when
using film speeds other than those on the dial.

The new Daylight Type Ansco Moviechrome Color Film (ASA 20)
has been provided for by the mark between 16 and 25 on
rilm Index Dial.

Each film type is designated by a film index number set by
A.S.A (American Standards Association). These indices are shown
m table below and in the pamphlet packed with your film

the

the

FILM TYPE

A. S. A. EXPOSURE INDEX

DAYLIGHT

TUNGSTEN

KODACHROME DAYLIGHT TYPE IT

25

12**

KODACHROME TYPE HA

25*

40

ANSCO MOVIECHROME DAYLIGHT TYPE

20

10**

ANSCO MOVIECHROME TYPE A

10***

16

*WITH DAYLIGHT CONVERSION FILTER
FOR TYPE A COLOR FILM.

*WITH NUMBER 80B FILTER.

'WITH 85 (TYPE A) FILTER.

Memorandum Exhibit 2

(pages 2 & 8 of Keys tone Model K 810 instruction bo obi

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1. Wind camera motor.
 2. Set A.S.A. dial. (Page 8)
 3. Set lens opening dial to "AUTO" or "MAN-UAL". (Pages 6 & 11)
 4. Set filter lever to correct position ("No Filter" for Outdoor Kodachrome). (Page 8)
 5. Open cover and load camera. (Pages 4 & 5)
 6. Frame subject in viewfinder. (Page 6)
 7. Hold camera steady.
- DO NOT BLOCK ELECTRIC EYE WINDOW.
8. Press operating lever. (Page 9)
 9. Wind camera after each scene.

CAUTION:

As with all movie cameras panning is not recommended, especially in the telephoto position. However when following a subject (as a child at play) your camera will automatically expose correctly even if you should pan or move camera during a scene. If panning is done hold camera steady and pan as slowly as possible.

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Before loading the film wind your camera motor. Lift the winding handle out of the recess in the case and flip it over into the winding position. Turn the winding handle clockwise until the camera motor is fully wound. After winding, turn the winding handle counter-clockwise and push it into the recess in the case.

run . . .

The operating lever is shown in the run position. This is the normal operating position.

LOCK ?

RUN ?

SINGLE ?

lock run ...

The lock run position is particularly useful when the camera is mounted on a tripod and the operator wishes to get into the scene being taken.

single frame . . .

The operating lever is shown in the single frame position. Single frame operation is similar to that of a still picture in that one picture is exposed at a time. It is particularly useful for making animated titles or other special effects.

Memorandum Exhibit 3

(pages 3 & 9 of Keystone Model K 810

instruction

booklet)

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