Zapruder Camera

Autor:
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Memorandum

R o: The_Sgeo d of Zapruder 's camera and FBI Agent Barrett's report

Cn pago 184 of Harold Weisberg's book, "Whitewash II: The FBI-Secret Sorvic© Ccverup (Hyattstown,Md . : Harold Weisberg, 1966) is published the FBI report 6f .Agent Robert M. Barrett, dated 12/4/63, of an Interview with Abraham Zapruder. The report contains tho following statements: "He stated his camera was fully wound, was set, manually, on maximum zoom-ions. The camera was sot

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

- added).

Lyndal ohaneyfelt testifies (5H160) that Zaprudor's camera.

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

m, t ^Zaprudsr ' g camera

dOoiah Thompson's research indicates that /didn't ©von have

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

(New York: Bernard Gels Associates, 19677 he states (page 16):

"On December 8 wo learned from Mr. Jones, Boll & 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. Jonas also told us that the Bell & Hcwell Company checked

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

tho FBI-determined 18.3 frames per second."

In view of the fact that Zaprud©r's camera had no 24 framos/second setting, and in vie w of tha fact that both tha FBI AND Bell & Sowell each tested tha camara 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 shew that this probably cams about because FBI agent Earnest confused camera speed with film speed.

The author in no way condones the fact that the Commission die! not publish the Barrett report, or deal with the information therein, which apparently contradicts Shanoyfelt 1 s testimony regarding the Zaprud e r camera speed. The purpose of this memo is to explain, in the clearest and simplest way, what the author thinks arc those technicalities which, confused Barrett in his interview with Zapruder.

At the end of the memo, we deal with tho 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) l' 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 HOT a PPly 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) Tho 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 filn has an A,S.At number of 25. (See Memorandum Exhibit 2)

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

used for indo 0 r photography, has an A.S.A. number of 40 o
(See Memorandum Exhibit 2)

(5) Kodachrome Typo IIA film is a film do signed for indoor uso 0
That is why it has a higher A.S.A. number. It is more sensitive t 0
light; this i3 what makes it an indoor film. This indoor film can

bs used outdoors, when an appropriate (salmon colored) filter
is put in place over the Ions of the camera. (This can be dnno
manually, or a control can bo operated on the camera which
inserts such a filter in front of the Inns, if tho photographer
has indoor (ASA 4o) film in the camera, but is taking pictures
outdoors .)

(6) In taking pictures, ono uses a light meter to determine the
proper lens oponing. Cno points tha light motor at tha seen®

to bo photographed , takes a reading, and' sots the lsns on tho
camera accordingly. Tho lens opening is read on a scale of tho
light meter.

(7) Tho Ions opening determines how much light will feat through

to tho film insido tho camera. It is a fact that, for given lighting,
there would be different satisfactory lsns openings, depending on
the light-sensitive properties of tho film that is insido tho camera.
Tho noedlo of tho photocell of the light-meter swings out to a certain
point, depending upon the illumination. But tho light meter does
rot know what type of film is in tho camera. This is information
that must ba ''told" to the light mater . This is why light maters
have a variety of different "scales" which can bo read.

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

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

Choosing the scale on the light mater is equivalent to telling
the light meter what type of film is in ths camera (is: what
ASA number). With that information, ths light meter thn than
give tho correct Ions opening for the scene at which is is pointed.

(8) Sloctric-oyo cameras

In elceti'ic © ye camer a s, th© light motor functi c n is incorporated
directly into the camera itself. When one points the camera at
a scene to bs filmed, an electric cyo photocell sets the lens of
tho camera to 1st tho proper amount of light fall on the film.

Again, fob given lighting intensity, different Ions© openings
would be required depending on ths typo of film (ie : film speed)
that is being used. In other words, different lenso openings would
bs required, for giv a n lighting, depending on th© ASA number of

ths film insido ths &lecti'i , c eye camera.

Just as the user of a light meter has to know which 3 calo
to read (depending on tho ASA number of tho film being usod),
sc tho oloctric oyo mechanism of an elsctSic eyo camera has to
bo told ths AS A number of tho film insido tho camera, so that it
can set th® lsnso corractly.

T h©refore, alectric eyo cameras have a knob, associated with
tho electric eyo mechanism, which ono turns to the film speed
number of tho film being usod inside ths electric oyo camera.

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

Electric eye cameras which run at mor© than one spaed will
have BOTH knobs— —on* for film speed, ono for camera spssd.

— kl

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

(9) Non electric eys cameras only havo a camera spool, on the camera.

In this case, the photographer is aware of th© fact that ho has

sat his lenso for the given light (and film speed) when he uses
his light mater, and reads that scale designed to give Ions
openings for tho particular film spood involved.

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

Shanoyfelt testifies (5 H l6o): "Th© Nix and Muchmore cameras •
wore both found (to run) around 18.5 frames par second. "

Whereas Robert M. Barrott interviewed Zaprudor, the FBI ssnt
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 tho
camsra spopd with which he took the abov e movie was believod to
ba 40 frames per soccnd. He was using a Keystone 'Zoom lens, 8 millimeter
camera and had the spood sot on normal. It was also set on automatic
eyo." (Emphasis added.)

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

18 and 24 frames per second is "only" 3Q^. 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

frams 313, for example, would-be only 2.58 sscondl At that camera second

s Feed, the 2 .3/minimuni firing tims of tha rifis would bo 92 film frames. Thus, the entire assassination would bo 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 3l3 rolled around, and all shots had been fired!

Therefors, if y 0 u want to cits obstanlss to the Commission's case, tho place to start is with th© published .Abernathy report- — - which boosts tha sps 9 d of the assassination 130$-—- not tha unpublished Barrett report, which "only" boosts the speed by 30$.

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

Ths timo between frame 210 and frame 313 is ::

ia) 5.6 seconds (Shanoyfolt, using Zaprudor camera at 18.3) (Shanoyfelt, using Nix camera at 18.5)

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

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

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

facs of two FBI reports which contradicted Lyndal Shansyfolt's testimony regarding ths camera speeds.

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

This is "run". A factory rap told mo this is factory sot at 16 frames per second. Furthermore, not® that there is no other control on tho camera to sot at any other camera speeds.)

Therefore, Abernathy wont bach and interviewed Nix again.

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

.... “ 6 —

Exhibit 1).

This report states two facts that are important.

a) Camera typo 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_Doc emb er 1, 1963 , he said the sotting was at 40 and ho was
using the zoom lens with Type A film when he photographed the
Presidential Mot 0 rcado in Dallas on November 22, 1953.” (Emphasis added.)

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

So much for the psychology of FBI agents.

(13) £r 0 ra the Keystone K-810 instruction booklet, wo loarn that:

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

b) Built into tha came a 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 to that indoor
film {AS A 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..."

(i^> Tungsten illm is in the camera, one would then set tha
ASA film dial on 40).

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

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

for hl ° to haTO Eaoa -V- B1:t was uslns

shows .

he would have to set the film creed dial at 40, if it was a
tungsten film, as the chart on page 8 of tho instruction booklet
-An FBI agent who is not up on these things could easily think
Fix meant Ms camera was running at 4o frames per second,
which would, be extremely slow motion .

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

Or does ho? His exact wording is:

Tho camera was sot to take normal spsod movie film or 24frames
per second."

Zaprdder was using ordinary outdoor f ilm (Kodachromo Daylight Type II)
Such film has an ABA number of 25,

It Is, perfectly reasonable that Barrett made a similar
mis tcko as | Abernathy , and mistook film speed for camora 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.)

(l£' In summary, Nix's camera only runs at cns factory seg speed.

That speed is 16 frames per second.

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

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

Zapruder 1 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 hh© author's opinion that both Abernathy (in the case of
and Barrett (in the case of Zapruder) made similar errors,
confused film speed with ca mera 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 tfte 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 tht reenactment film o takes 3.5 seconds to do what Zapruder's film does in 4.97 seconds!

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

I dcn J t think that the two are related. Note that thero is an independent explanation for Barrett AM) Abernathy's report, if they, are in enuor.

Assuming they arc both in error, then that still leaves the question unabfawered 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 wo are dealing with an absolute time segment her® of 1.4 seconds. Any of the following factors might account for this:

1) l ? he FEI's location of " frame 210" or some other important marker frjame, is off by a few feat. (11 mph is 16.1 feat per second.

'%is 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 t hi s issue to the question of Barrett's report.

Barrett's report is provably false, simply because it is physcially 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 c lo 3e to being sheer numerology. There is no logics! relationship there .

.Only if the BarreSt 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 w© 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

539 of Volume 24 (CS

2109 & CE 2110)'

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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 th 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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O j_' 0 j cJ i !

1. Wind camera motor.

2. Set A.S.A. dial. (Page 8)

3. Set lens opening dial to "AUTO" or "MANUAL". (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

instruct i 0 n

booklet)

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