



TOM BERTONE CONSULTING

14113 REIS STREET
WHITTIER, CA 90604

A METALLURGICAL CONSULTING CORPORATION

(562) 941-2911 Office (562) 944-8891 FAX

www.metallurgy.com

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Case: AUTOMOTIVE ACCIDENT INVESTIGATION

Re: HEADLIGHT BULB FILAMENT ANALYSIS

Metallurgical Analysis

The subject light bulbs removed from the defendant's vehicle (a 2003 Chevy 1500 pickup), were received from defendant attorney's office with an attached letter and hand delivered to Tom Bertone Consulting, Inc. (TBC), for non-evasive macroscopic examination of the filaments and photo documentation.

Although the handling of these bulbs by the investigating police department is considered crude and not according to established police investigative protocol; the current condition of the filaments does not preclude a definitive analysis and / or conclusions in this case. Initial photos of the bulbs and record of custody tag are shown in Figures 1 and 2. The record of custody and documentation of same, from the time the bulbs were removed from the accident vehicle to date is more than one year.

Macroscopic Examination

An initial macroscopic examination of the bulbs and filaments was conducted at TBC's metallurgical laboratory, followed by a more definitive macroscopic examination at Stork MMA Laboratories, Inc., Huntington Beach, CA., using a 7x to 70x magnifying Nikon Stereo Microscope with digital photographic capability.

A series of macro photographs were taken to show the condition of the filaments inside the sealed glass headlight bulbs. The bulbs are 80W and single 100W light bulbs; see Figures 3 through 6.

Research

A study of accidents involving the fracture analysis of bulb tungsten filaments was conducted as a means of familiarizing those less experienced with the impact and thermal conditions causing filament fracture; see Figures 7 and 8.

Conclusions

In the opinion of this metallurgist, following macroscopic examination of the subject light bulbs, both 80W bulbs and the one 100W light bulb were "Cold or Not On" at the time of this accident. The brittle failure exhibited by the 80W light bulb tungsten filament was cause by "Cold-Snap".

Respectfully Submitted,

Thomas J. Bertone, CPC, SDS
Metallurgy Professor

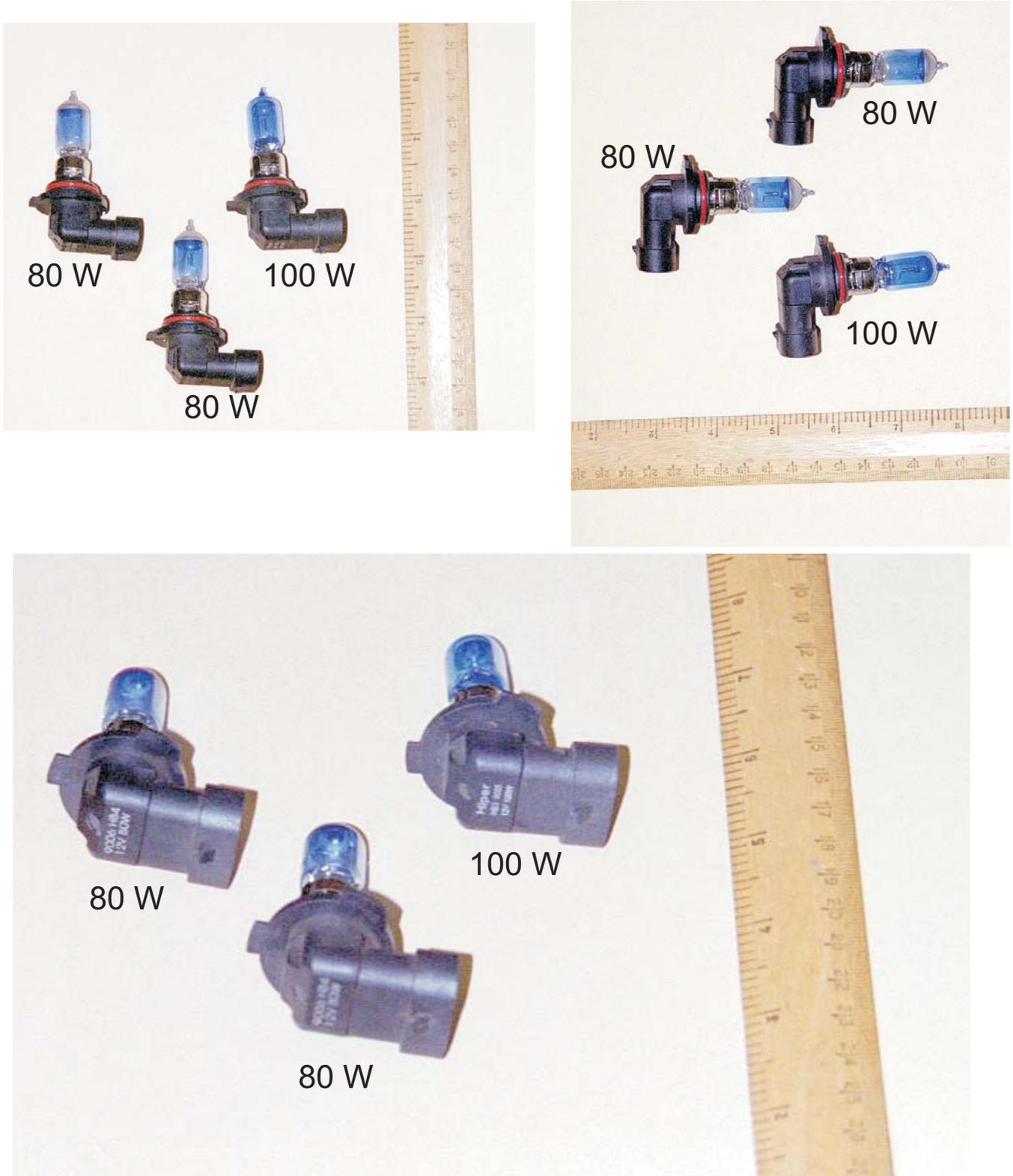


Figure 1. Lamps from Automobile Accident- Photos taken at ARB, Inc., by TBC showing different views and bulb identification.



TAG - LIGHT BULBS

PROPERTY TRANSFERRED FROM		TRANSFERRED TO		TRANSFERRED BY	DATE	TIME
RECEIVED BY: Smith 310	RECEIVED FROM: hooker 10	DATE: 12-11-02	TIME: 1904	RELEASED TO: H 209	DATE: 4-1-03	TIME: 1445
RECEIVED BY: JAIME 269	RECEIVED FROM: RR	DATE: 4-1-03	TIME: 1445	RELEASED TO: RR	DATE: 4-2-03	TIME: 1630
RECEIVED BY: RR	RECEIVED FROM: JAIME 269	DATE: 4-2-03	TIME: 1630	RELEASED TO: RR	DATE: 9-16-03	TIME: 1455
RECEIVED BY: RR	RECEIVED FROM: RR	DATE: 9-16-03	TIME: 1455	RELEASED TO:	DATE:	TIME:
RECEIVED BY:	RECEIVED FROM:	DATE:	TIME:	RELEASED TO:	DATE:	TIME:
RECEIVED BY:	RECEIVED FROM:	DATE:	TIME:	RELEASED TO:	DATE:	TIME:
RECEIVED BY:	RECEIVED FROM:	DATE:	TIME:	RELEASED TO:	DATE:	TIME:

REFRIG.

FREEZE

DRY

FRAGILE

LATENTS

FOUND

SAFEKEEPING

EVIDENCE

Bin No. C-13-C

Reg. No. _____

POLICE DEPARTMENT CASE NO. _____

Item No. 1

Crime(s) TRAFFIC COLLISION (901T)

LR # _____

Name of Suspect(s) _____

Name and Address _____ Owner Victim

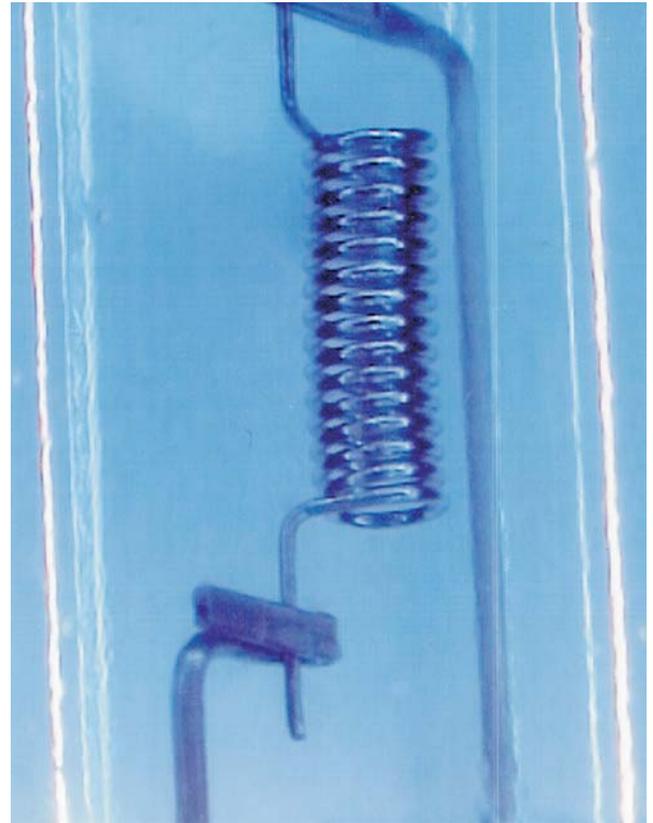
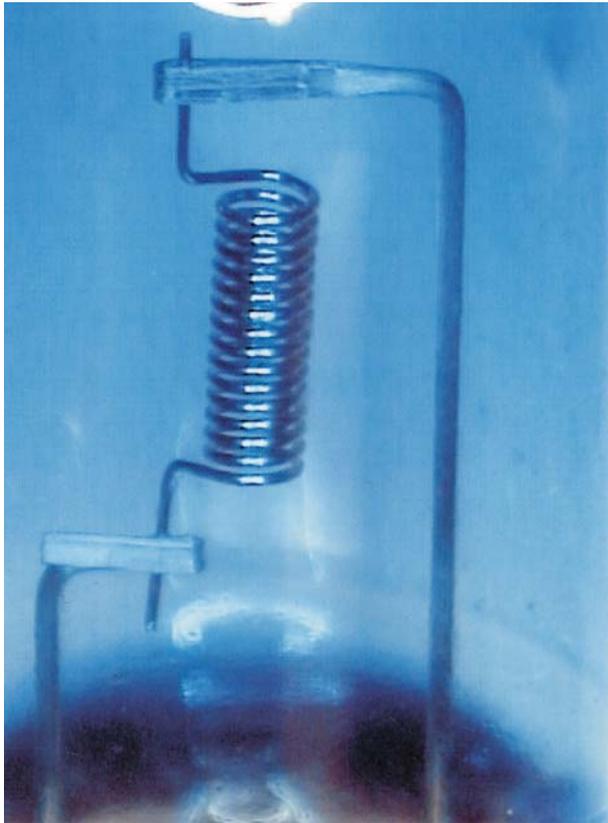
Description and Serial Number
3 LIGHT BULBS FROM V-2

From Whom Obtained or Where Found
V-2'S HEADLTS. (BULBS)

Collected By: Date Time _____ Relinquish To: Date Time _____

Figure 2. Record of Custody Tag - Front and Back Sides.





100 W Light Bulb Filament

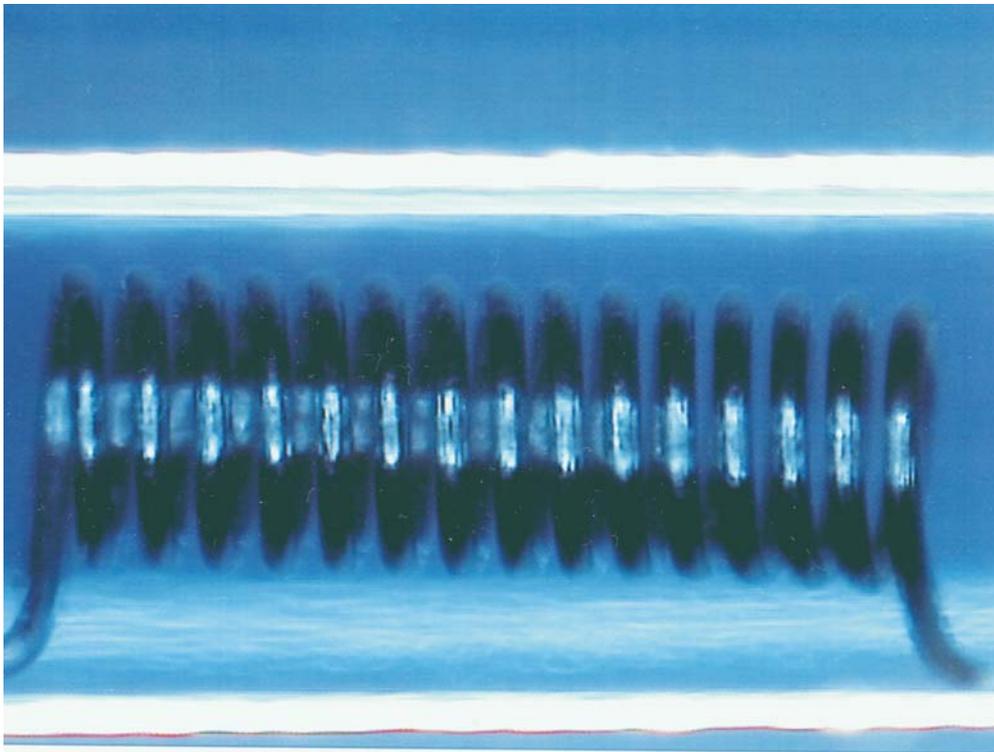
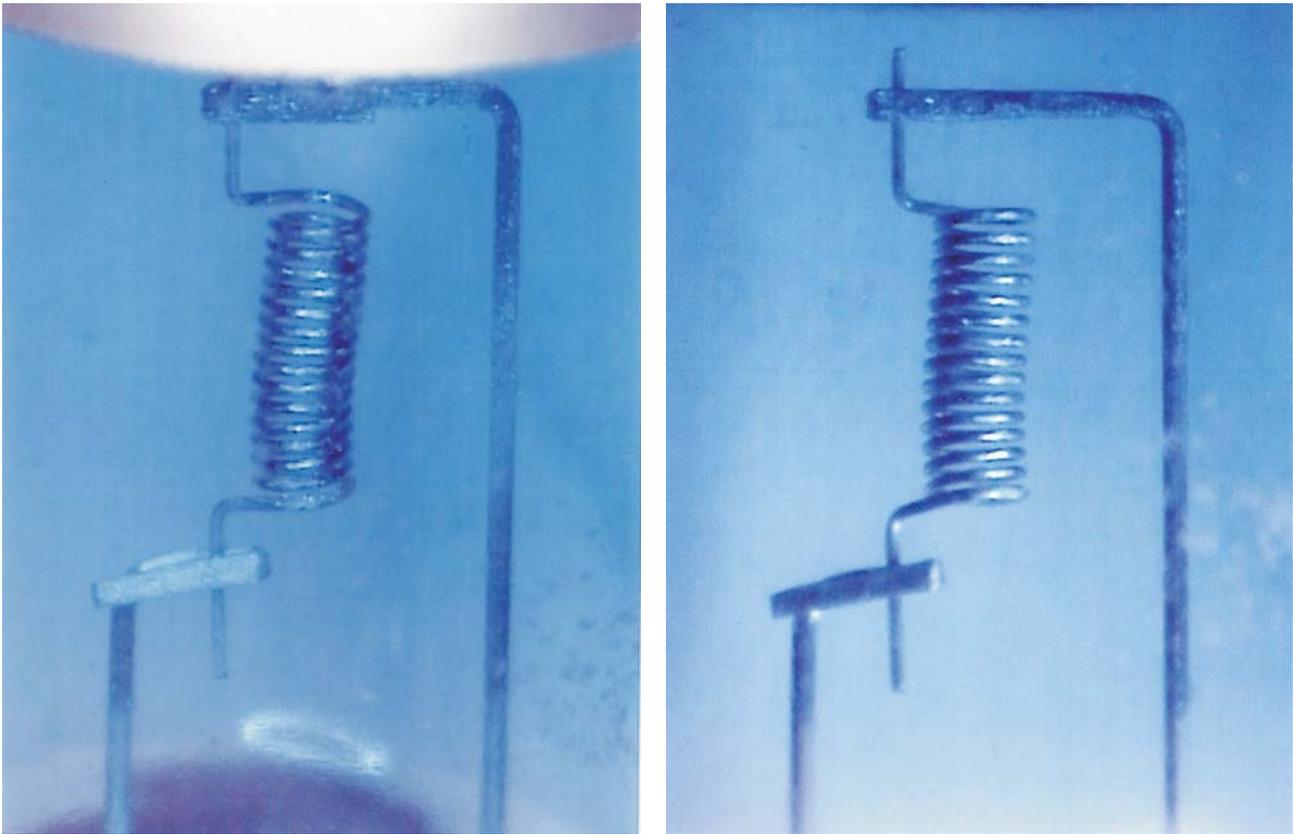


Figure 3. Magnified view of the 100 W light bulb filament, showing the filament coils in near perfect condition. No hot stretch is evident and breakage did not occur.





80 W Light Bulb Filament

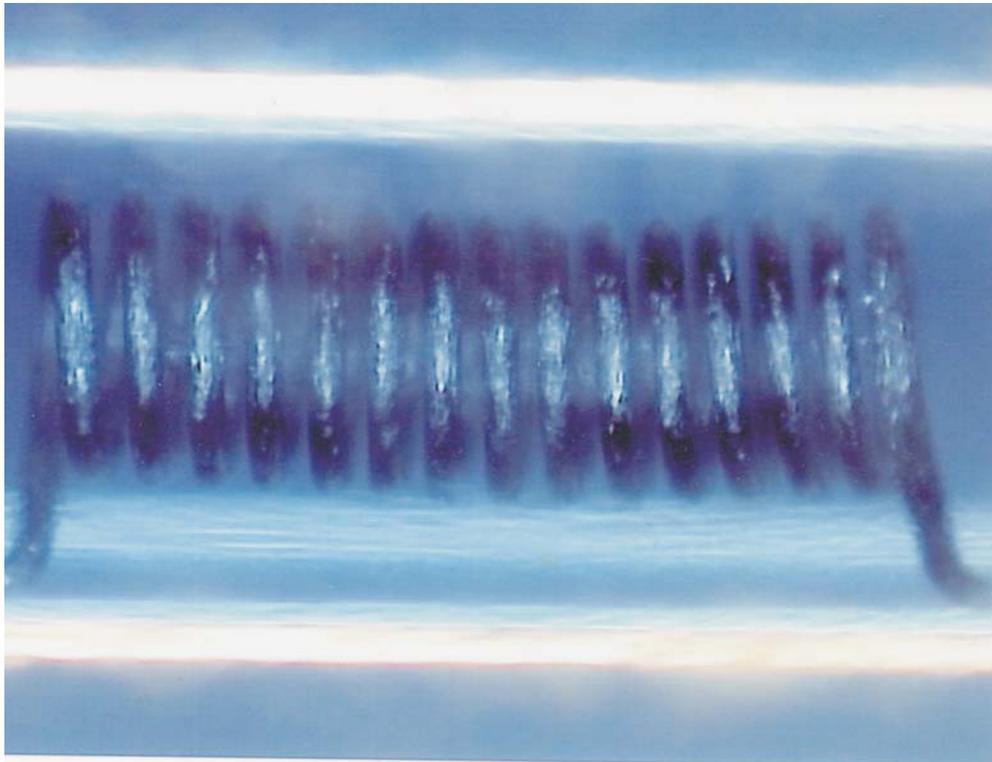


Figure 4. Magnified view of the 80 W light bulb filament, showing the filament coils in near perfect condition. No hot stretch is evident and breakage did not occur. The rough surface is caused by normal crystal formation during use.



80 W Shattered Light Bulb Filament

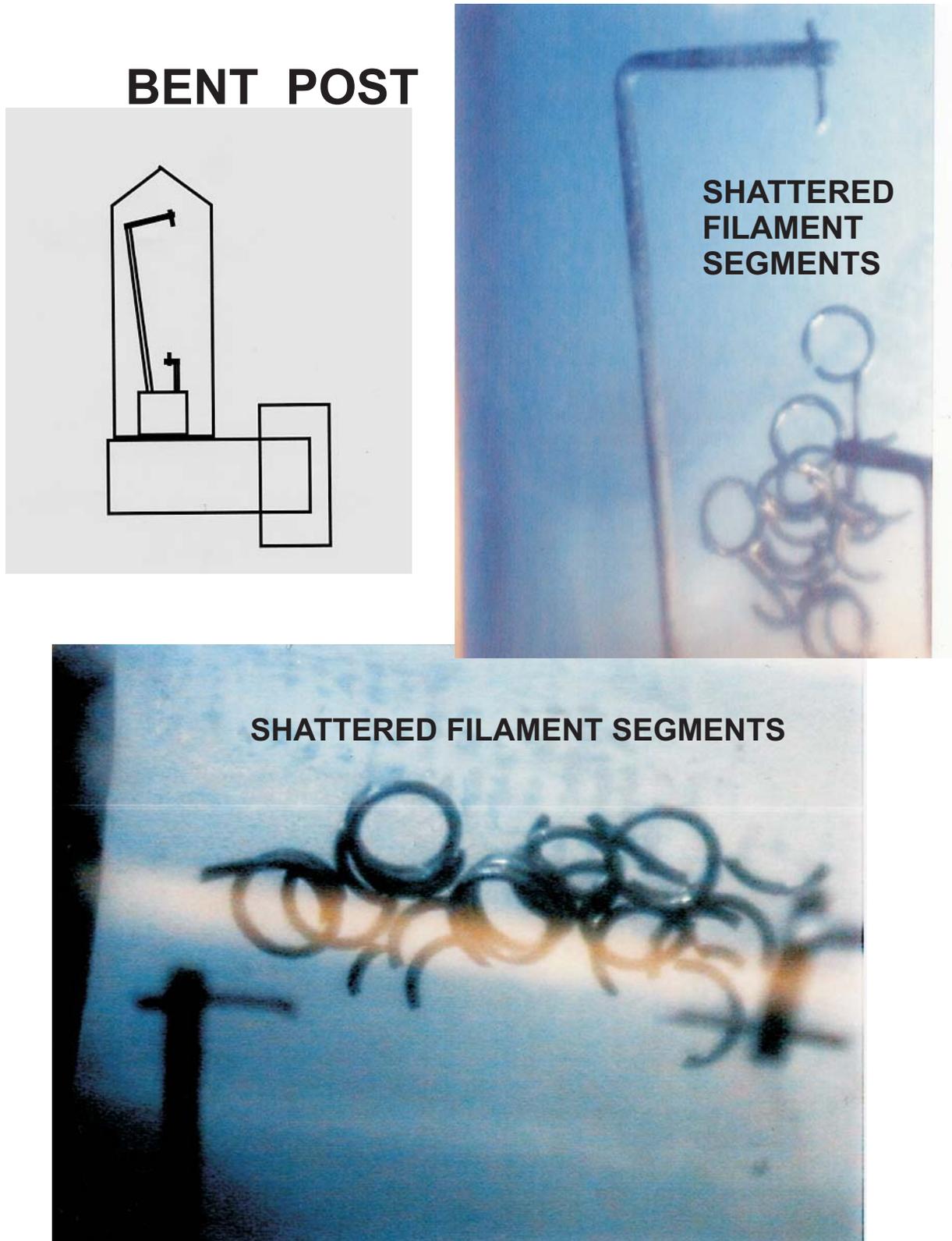
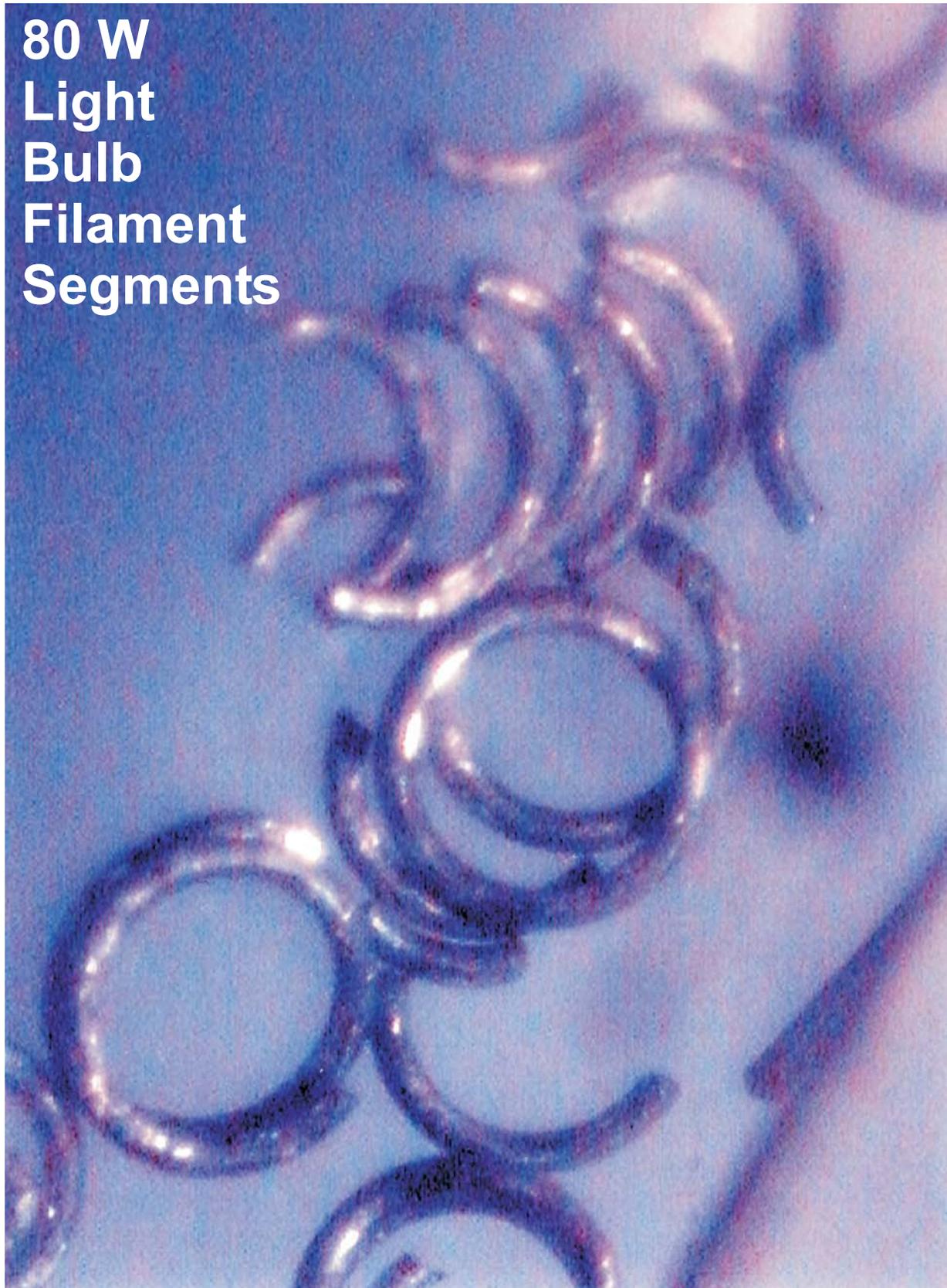


Figure 5. Magnified view of the 80 W light bulb and shattered filament segments. No melting and/or stretch is evident when the filament broke (shattered). The schematic helps in viewing the bent post in the upper right photograph.





**80 W
Light
Bulb
Filament
Segments**

Figure 6. Magnified view of the shattered 80 W light bulb filament segments. Multiple brittle fracture occurred due to “COLD-SNAP” as a result of impact forces. Brittle shattering of the filament indicates the bulb was not on at the time of the accident.

