



(T) +27 12 844 0310
(C)
(E) info@tmi-za.com
(W) www.tmi-za.com

14 May 2018,

The Legal Resource Centre (LRC)
5th Floor Braam Fischer Towers
20 Albert Street
Johannesburg

Per email: mutondi@lrc.org.za

Dear Mutondi Mulaudzi,

Subject: The death of Dr Neil Aggett whilst in custody in Cell 209 John Vorster Square

TMI Dynamics received a request from the Legal Resource Centre in January of 2018, to assist analysing whether the cause of death of Dr Neil Aggett was due to hanging. The questions that need to be investigated and verified are the following:

1. Is it possible to hang yourself, by dropping a short distance;
2. Is it possible to hang yourself with the material used in this situation;
3. The clearance between the feet and floor of Dr Neil Aggett is approximately 20cm, would the material approximately 1.640 metres long not stretch that distance by 12%;
4. There was only one fingerprint lifted by the fingerprint expert, would it be possible to climb up the frame enclosure as shown in Figure 1 to the position where the knot was made on the jail frame and only leave one fingerprint;

The following compilation of documents analysed to develop the circumstances of the hanging of Dr Neil Aggett:

1. Two post mortem reports, one by the State forensic pathologist, Dr VD Kemp and one by the family appointed pathologists, Dr J Gluckman and team;
2. Several affidavits made by the State Security Police and the South African Police Services;
3. The Judgment in the Magistrates Court for the district of Johannesburg;
4. The Exhibits and Summary of Record;
5. The photographs as shown in Figure 1;
6. Dr Dinesh Rao's Forensic Pathology e-book, available online at, <http://www.forensicpathologyonline.com/e-book/asphyxia/hanging>

This preliminary report serves to analyse the late Dr Neil Aggett's hanging, in which he suspended himself using a piece of material/shawl from the horizontal upper bar of the jail fixed frame panel in custody in the John Vorster Square Prison.

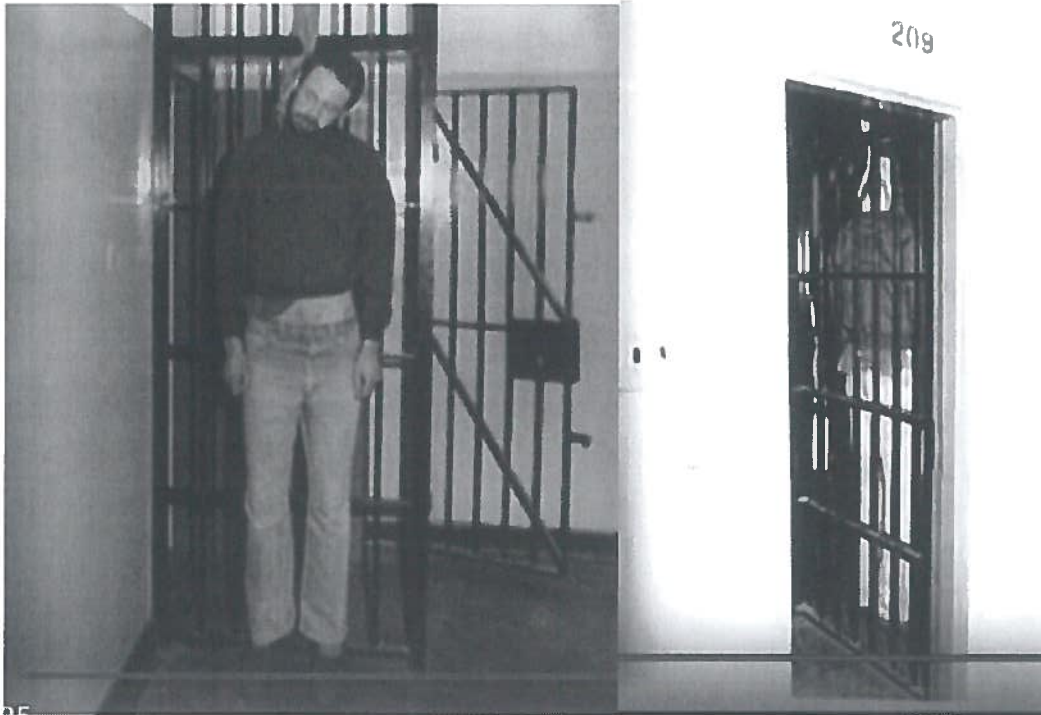


Figure 1 Photographs provided of Dr Neil Aggett hanging

Both the post mortems confirm the cause of death of Dr Neil Aggett, was due to hanging. There are documented findings, hangings with soft materials can be due to three types:

1. the **Asphyxia/suffocation** due to the blocking of the airways that carry oxygen to the lungs;
2. Venous congestion blocking of the jugular veins which that carry oxygenated blood to the brain;
3. Or dislocation/fracture of the cervical vertebrae due to a sudden jerk as in the case of judicial hanging.

In the case of Dr Neil Aggett, the post mortem's conclude the cause of death as hangings, however both have rule out the dislocation of the cervical vertebrae. In the case of Dr Neil Aggett, he used a soft shawl which measured 1640mm by 950 mm which is very different to a rope or a thin cord. So the most likely cause related to hanging in Dr Neil Aggett's situation is due to asphyxia or venous congestion or both which requires a 15 kilogram compression force applied around the neck. This 15kg compressive force is enough to narrow the laryngeal and tracheal lumina that results in the airway being blocked depending on how it is knotted around the neck it applies direct compression to the jugular veins.

This report aims to determine the compression force that was applied around the neck due to the mass of all the body segments that were suspended and whether the shawl material was strong enough to suspend the Dr Aggett without failing/tearing.

I, Thivash Moodley, an aeronautical engineer, with 19 years' experience in aeronautical and mechanical engineering projects in the aerospace, defence, maritime, logistics and industrial sectors have used all the information provided by the Legal Resource Centre and desk research into types of hangings study by forensic pathologists to provide a preliminary outcome.

1 The Data Gathered from the file provided by the LRC

1.1 Physical Dimensions of Dr Neil Aggett

Physical dimensions of the late Dr Aggett:

Height = 1.81m

Weight = 64Kg

Age = 29 years

Based on the pictures seen of the late Dr Aggett and the physique described by the Chief Pathologist Dr VD Kemp, he was Average in build.

1.2 Prison cell fixed wall panel dimensions adjacent to door

A visit to John Vorster Square was undertaken on the 20th of March 2018, to view the prison cell where Dr Aggett was found. Due to changes at John Vorster Square, the two photos in Figure 1 was used to determine the exact prison cell. The following figure is a photograph of the current jail fixed panel and door.

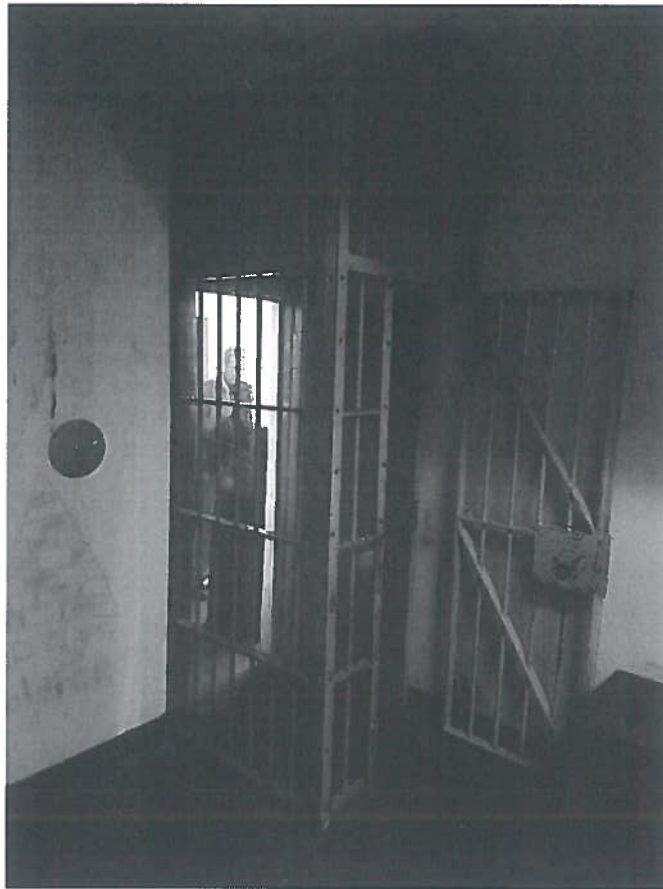


Figure 2 Photograph of the Jail Door and Fixed Panel

The door and the fixed panel in Figure 2, was measured during the visit and a manufacturing drawing with all the critical dimensions was recreated.

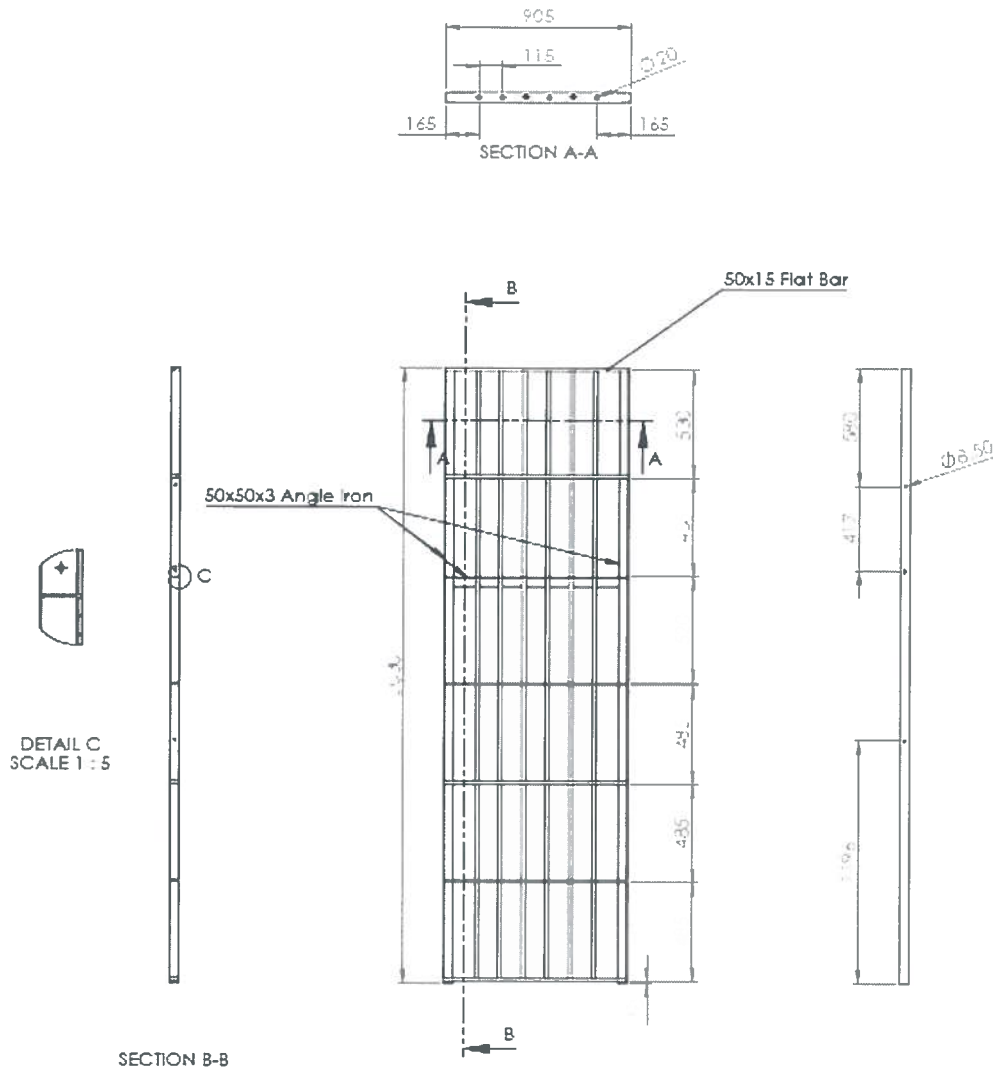


Figure 3 Drawing of the jail fixed panel that Dr Aggett allegedly hung himself from.

Measurements of the fixed panel was taken onsite and the fixed panel was redrawn to determine if the height was enough to suspend Dr Aggett who was 1,81 metres tall. Using figure 1, it can be clearly shown that Dr Aggett's head is inline the 4th horizontal panel.

2 Analysing Dr Neil Aggett's hanging

To analyse Dr Neil Aggett's hanging, the following important features of the hanging was investigated:

1. The suspension of Dr Aggett above the ground;
2. The weight being suspended by Dr Aggett's neck;

3. The strength in the shawl to support Dr Aggett's weight without tearing or stretching;

These are the only three mechanical factors that can be considered in the case of hanging.

2.1 The suspension above the ground

Dr Aggett's height as provided in the post mortem report was 1810 millimetres (mm)

As seen in Figure 1, the top of Dr Aggett's head was in line with the 4th horizontal bar above the ground. Figure 2, shows the height of the 4th horizontal bar is 1985 mm above the ground.

From this it is clearly deduced that Dr Aggett was suspended 175mm above the ground. This can be described as a "Complete Hanging" as no parts of Dr Aggett's body was partially suspended.

2.2 The weight being suspended by the material used to hang

From Figure 1, it can be seen that the entire material breadth of 950mm was wrapped around Dr Aggett's neck.

Dr Aggett's neck supported his entire body weight of 64kgs.

In the case of **asphyxia**, a compression force of 15kgs around the neck is sufficient to block the persons airways. The material noose tied to Dr Aggett's neck supported 4 times the compression force required for **asphyxia**.

2.3 The shawl used to suspend the late Dr Aggett

The shawl used to suspend Dr Aggett was made of a wool blended with other material. It was important to test the material to verify if it had a tensile strength that was capable of suspending Dr Aggett's mass of 64 kilograms. The shawl used was designed and made of the same properties as shown in Figure 4.

It is important to note that the material was woven with a 45 degree weave across the length and the breadth, which means that its strength in the direction of the length or breadth would be the same.

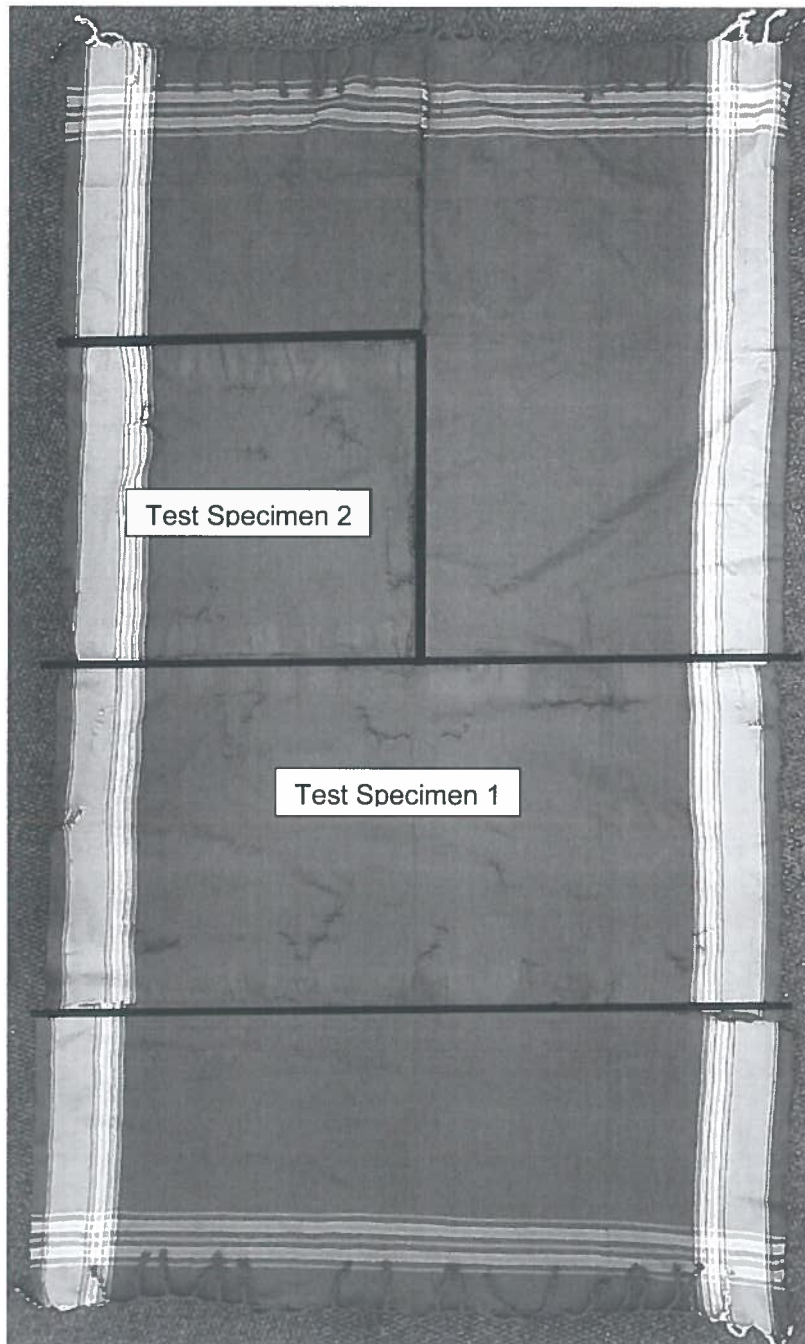


Figure 4 Similar Shawl used in the hanging

In order, to establish whether the material was strong enough, it was important to test the tensile strength of the material. The Mechanical Engineering Department at the

University of Pretoria had a tensile testing machine that was used to perform to experiments.

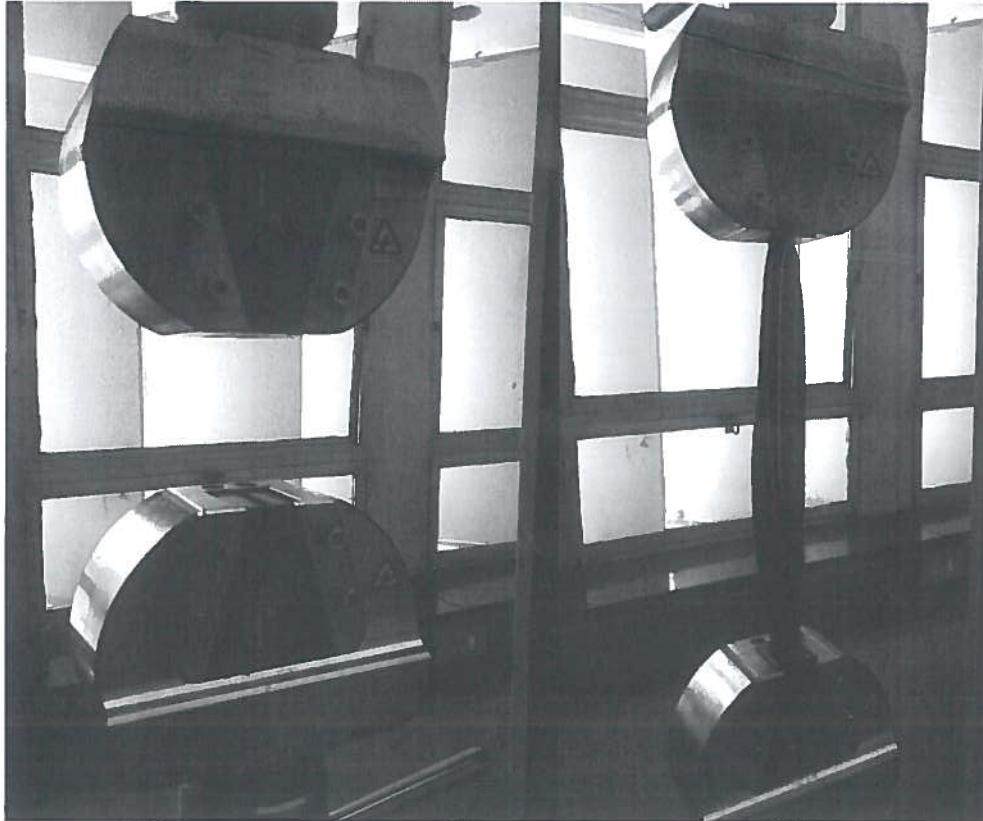


Figure 5 Pictures of the tensile testing machine without and with Specimen 1

The results of the experiment are found in the Table 1 below.

Table 1 Results of the Tensile test of the

Specimen	Dimensions of Specimen	Tensile Force to tear the material
Specimen 1	950mm x 450mm	6800N (or 680 kg)
Specimen 2	475mm x 440mm	2100N (or 210 kg)

Both the tests reveal that the material was definitely capable of supporting Dr Aggett's mass without any strain. In Figure 4 it can be seen even after cutting the two specimens and subjecting the specimens to the large forces of 640Kg and 210Kg, it can be seen that material did not permanently deform because the entire shawl was pieced back together to form on complete unit. The specimens only suffered isolated random tears in the material.