

LFI: **Staircase Trip & Fall** @ Water Treatment Plant



What Happened..?

- o Employee was climbing up the concrete staircase to the flocculation channels.
- o He felt a pain in his left calf muscle, but he could still walk upstairs.
- o His left calf muscle progressively tightened, he reported to Medical Station and saw the doctor the next day.
- o Employee returned to work after 7 days.



Staircase with 33 steps at Flocculation Channels

IOD LTI – 24 April 2023

- Water Treatment Plant - Sandfilter @ 12H00 -

Why Did It Happen..?



Flawed Method / Haste / Routine Activity without Thought



Stair Design per Standard



Boots in Safe Condition



Temp Mixing Tank / MOCA in place.

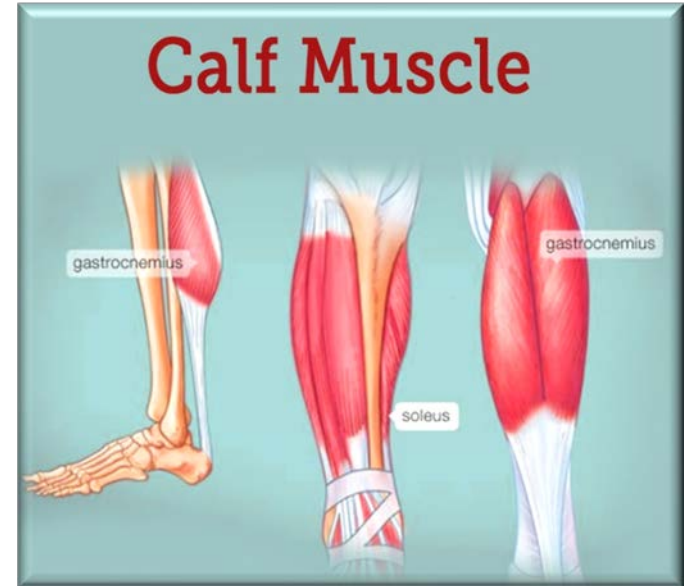


Faulty Pump per MOCA

IOD **LTI** – 24 April 2023

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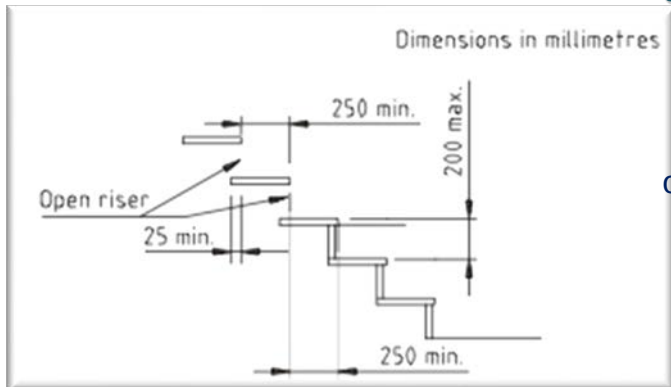
Why Did It Happen..?



Calf Strain: The calf is made up of 2 muscles called the gastrocnemius and the soleus. Overstretching or tearing either of these 2 calf muscles is known as a calf strain.

Walking Up and Down a staircase:

Methodology is 1 step at a time because the design of the staircase does not prevent calf strain if you leap 2 steps at a time..



Stair Design per Standard

Sub-Standard Acts?

- o Flawed Method of Ascending Staircase: 2 steps at a time – overexposure of physical capability. *Contributing Factor: 33 Steps on 2-tiered staircase, and frequent use because of temporary mixing operation on top of flocculation channels.*

Sub-Standard Conditions?

- o **Manual operation** of the automatic operated polyacrylamide dosing system because of delay in mechanical pump replacement necessitating a temporary MOC.
- o Human Factors not adequately considered in MOC design, i.e. Placement position of valve for controlling water addition placed at ground level (33 stairs) – should be next to temporary mixing tank.

Root Causes?

- o **Safe Behaviour:** Inadequate ID of critical safe behaviour when ascending staircases: 2 steps at a time to prevent overexposure of physical capability.
 - o *IOD Flash & Toolbox Talk & Safety Standdown & Safety Observations/Interventions*
- o **Management of Change:** *human factors not adequately addressed in MOCA process – i.e. physical ease of (safe) operability of temporary acrylamide mixing station installation.*
 - o *MOCA checklist to include human factors checklist – PSM Manager.*
- o **Inadequate Maintenance:** **Insufficient Funds for required Maintenance:** funding success based on risk ranking (safety included) versus funding pool available.
 - o *Review MOC (human factors), redesign and assess whether LTI risk removed or risk ranking for funding has increased.*

System Deficiencies?

- o Competency / Training and Communication: Employee Orientation and Awareness:
 - o IOD Flash: Ascending staircases 1 step at a time and use handrail.
- o Management of Operational Risk & Change: MOC
 - o Include human factor checklist as part of operability study.

Lesson's Learned?

- o *Climbing UP a flight of stairs also requires safe behaviours – i.e. 1 step at a time with 3-point contact at all times per plant safety procedures. Non-plant staircases: use the handrail when installed.*
- o MOCA's must consider human factors: part of design and operability study.

Thank You

“Do your little bit of good where you are;
its those little bits of good
that when put together
can change the world”

Desmond Tutu