



Pedal operated handwashing station responding COVID-19 pandemic

By WaterAid Bangladesh





Photo courtesy: WaterAid and Nabolok activity under SIDA COVID -19 response project

COVID-19 spreads rampantly and local authorities must take action to prevent further transmission, reduce the impact of the outbreak, and support control measures. In response to the global COVID-19 pandemic, implementing handwashing station to promote hygiene behavior effectively, WaterAid Bangladesh (WAB) has demonstrated different technological options including pedal operated handwashing stations. A document titled [‘HANDWASHING STATIONS: An easy-to-use technological and context-based’](#) has already been published and shared by WAB which is being very widely used by the sector. This document provides an additional guidance to demonstrate pedal type handwashing facilities that can be widely used in low-income countries.

Pedal operated handwashing station

The pedal operated handwashing station helps in sanitizing hands without physically touching the water tap and soapy water or other liquid soap dispensers, thereby making it least potential for contamination at public and common places usage. The station is mechanically operated by foot.

Advantages over other handwashing stations

- The pedal operated handwashing stations can be made inclusive for which it is user friendly to children and person with disabilities
- As foot operated, sanitizing hands without direct physical touch to any surface make it safe for usage at common places.
- Encourage people to do frequent handwashing due to its innovation
- Controlled by pedal power for which excess water use can be minimized.

Design considerations

The proposed pedal operated handwashing stations are designed considering the specifications mentioned in the WAB document titled [‘HANDWASHING STATIONS: An easy-to-use technological and context-based’](#) and a WaterAid UK document [‘Design specification for handwashing stations in public places and buildings’](#) to make the stations operational and sustainable. Few of the considerations are type and availability of local materials and easy way of construction, running water provision, accessibility (child and disable friendly), provision of wastewater drainage system, use of easy cleaning material, easy operation and maintenance, etc.

Option 1: Single-user pedal operated handwashing stations

Assembling process:



Making of MS angle frame

- Make a frame with **25.4 mm x 25.4 mm MS angle**. The overall size of the frame is 400 mm x 400 mm x 1473 mm (Figure 1)
- Add **19 mm MS flat bar** to support water tank as shown in the Figure 1
- Attach **1mm MS sheet** at one side of the frame which either to be used for attaching a mirror or hygiene messages as shown in the figure 1.
- Add a **bracing structure** at a height of 910 mm using 25.4 mm x 25.4 mm MS angle to support sink as shown in the figure 1

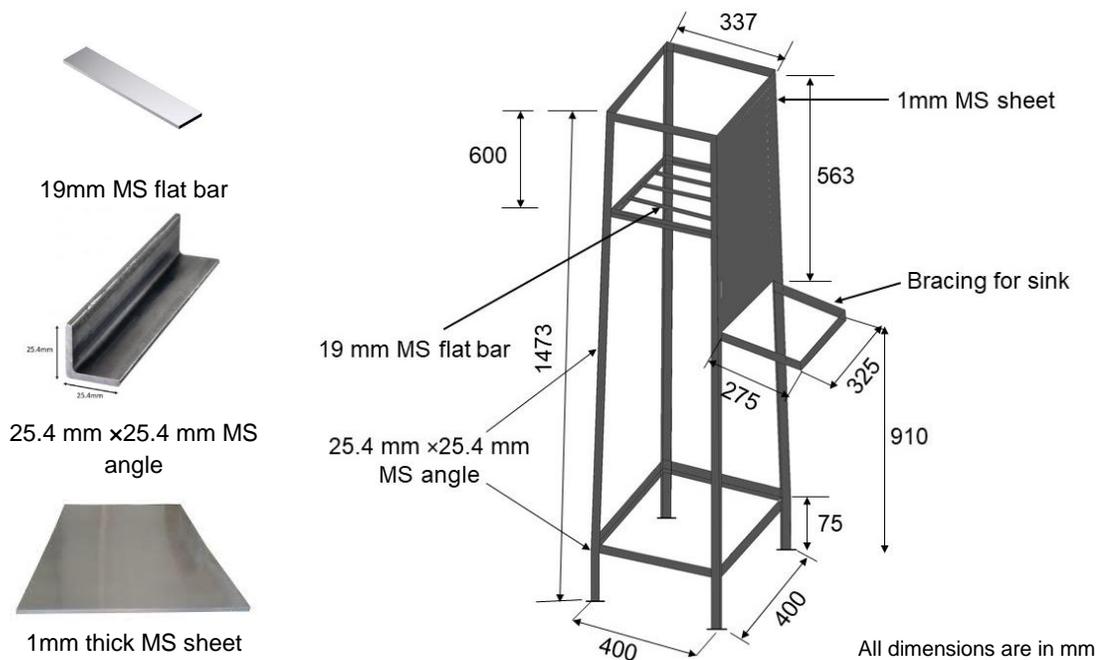


Figure 1 : MS angle frame and other components attached with the frame.

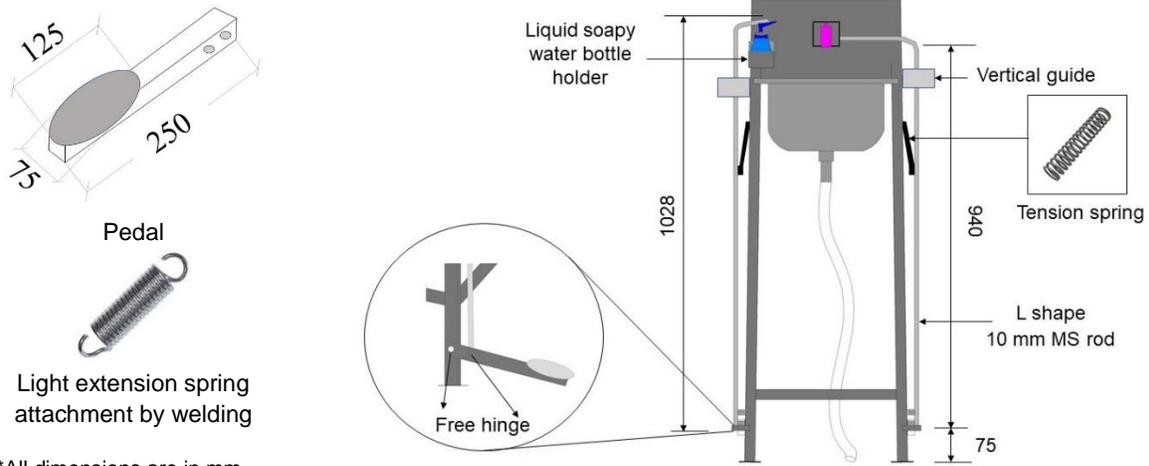
- Make a round **soapy water bottle holder** (250 ml refillable) using 3 mm MS sheet. Fix the liquid soap holder at the right side of the frame so that people can have soap holder at their left (figure 2)



Arrangement of pedal operated system

- Take a 250 mm long MS box pipe (25.4 mm x 25.4 mm) and attach an oval shape footrest made of MS sheet at one end. Attached another end of the **pedal** with the frame using a hinge as shown in the figure 3.
- Fixed one **vertical guide** with the frame to keep the MS rod in vertical position as shown in the figure 2
- Make a **L shape 10mm MS rod** with a vertical dimension of 1028mm for soap dispenser and 940mm for water tap. The length other part of the L shape needs to measure at actual and bend accordingly.
- Place the bar through the vertical guide and attached the lower end with the pedal with **free hinge** as shown in the figure 2
- Connect a light **extension spring** with the rod and frame so that it carries the self-weight of the rod only and the spring can bring back the pedal system to operational mode after every use.
- Make two pedal set, one for soapy water and another for water dispensing. Horizontal part of the bar is to be placed just above the soap dispenser and push shower.

- The user will use the left pedal for soapy water and the right one for water dispenser. The total pedal system will push downward for getting soapy water and water supply.



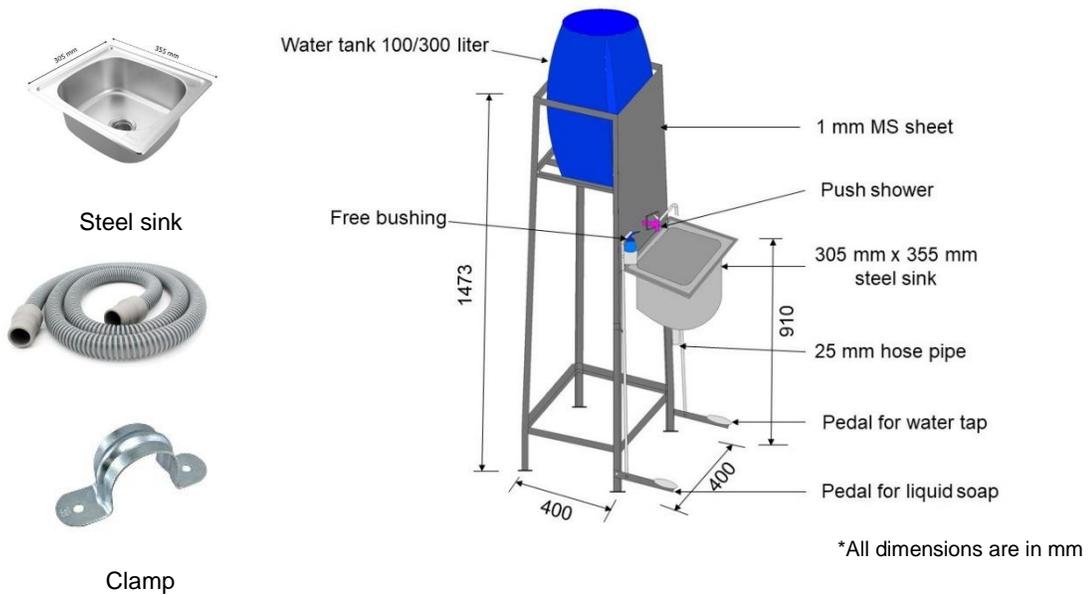
*All dimensions are in mm

Figure 2: Pedal operational arrangement (Pedal stick, L shape rod, Vertical guide, extension spring)



Step 3: Fixing tank, sink and plumbing accessories

- After painting frame and pedal set, a 305 mm x 355 mm steel sink fixed at a height of 910 mm of the frame (Figure 3)
- A fixed push shower is attached with necessary plumbing accessories for water dispensing (Figure 3)
- Place a tank of 100 to 300 liters and connect with running water. Additionally, a hose pipe and clamps are needed for drainage connection
- Finally, after fixing all the plumbing accessories for water supply connection and drainage the station is ready for use (Figure 3). Click [here](#) to watch the video of this type pedal operated stations.



*All dimensions are in mm

Figure 3: Single user pedal operated handwashing station

Unit Cost: 8000 BDT or 95 USD approx.

Option 2: Dual user inclusive pedal operated handwashing station



Assembling process:

Making of MS angle frame

- Make the same frame as mention for the Option-1 model and add additional provision to attach another sink at the opposite side of the frame. This sink can be attached at lower height (610 mm) to ensure accessibility to children and people with disability. (Figure 4)



Arrangement of Pedal operated system

- Same as Option 1 model. Add another pair of pedal operated system for additional sink.

Fixing tank, sink and plumbing accessories



- Same as Option-1 Model and fix an additional sink with additional accessories for Inclusive user.
- After fixing all plumbing accessories for water supply connection and drainage the station is ready for use. Click [here](#) to watch the video.

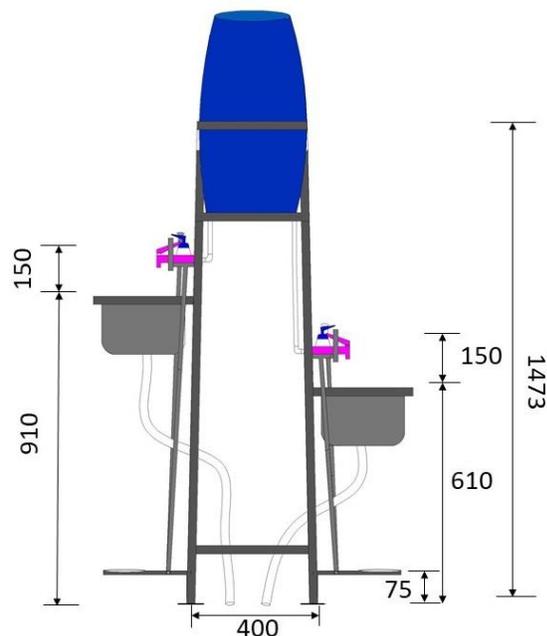


Figure 4: Dual-user inclusive small pedal operated handwashing station

Unit Cost: 11000 BDT or 130 USD approx. (for 2 Users)

**Option 3:
Multi-user
inclusive
pedal operated
handwashing
station**

Assembling Process

Making of MS angle frame



- Make a frame with 50.8 mm x 50.8 mm MS angle. The size of the total frame is 1000 mm x 1000 mm x 1036 mm (Figure 5)
- Add 25 mm MS flat bar bracing for supporting water tank at top. (Figure 5)
- A 25mm x 5mm flat plate basin stand is needed for install the steel sink with a dimension of 508mm X 430 mm. (Figure 6). Alternately basin could be hanged from the Top angle of the frame or adding another bracing at the height of

basin.

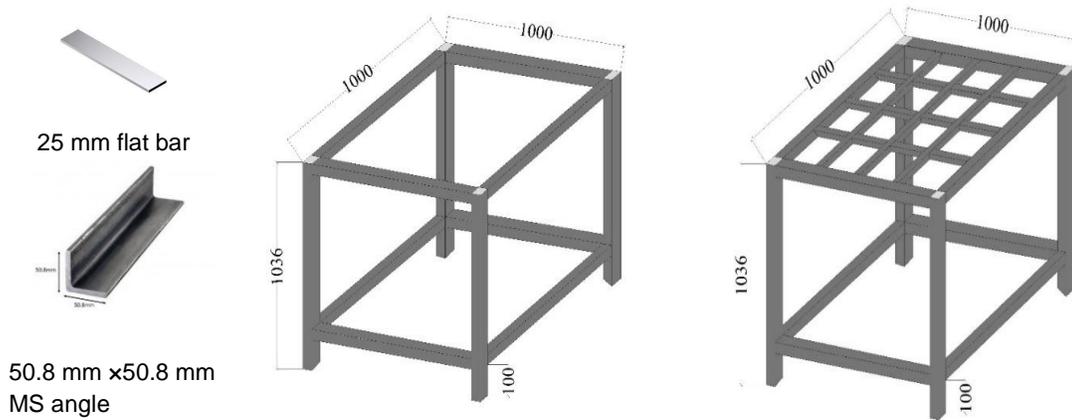


Figure 5 : Process of MS angle frame making with dimensions

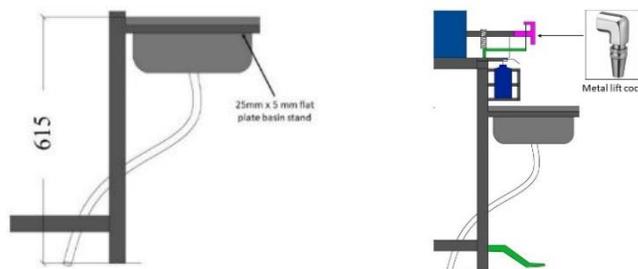
*All dimensions are in mm

- Make a round soapy water bottle holder (250 ml refillable) using 3 mm MS sheet. Fix the liquid soap holder at the right side of the frame so that people can have soap holder at their left (figure 6). Similarly, follow the process for other sides.

Arrangement of Pedal operated system



- Make a pedal by a 250 mm long 25.4 mm x 25.4 mm box and attached a footrest made of MS sheet same as option 1. Attached the pedal with the frame using a hinge
- Make two pedal set, one for soapy water and another for water dispensing for each sink.
- The user will use the left pedal for soapy water and the right one for water dispenser. The total pedal system will push downward for getting soapy water and water supply.



*All dimensions are in mm

Figure 6: Arrangement of metal lift cock and soap



Fixing tank, sink and all plumbing accessories

- After painting frame and pedal set, a 508 mm x 430 mm steel sink fixed at a height of 910 mm in two side and 610 mm in another side for inclusive use purpose. (Figure 8). The steel sink could be replaced by plastic or ceramic basin as available.

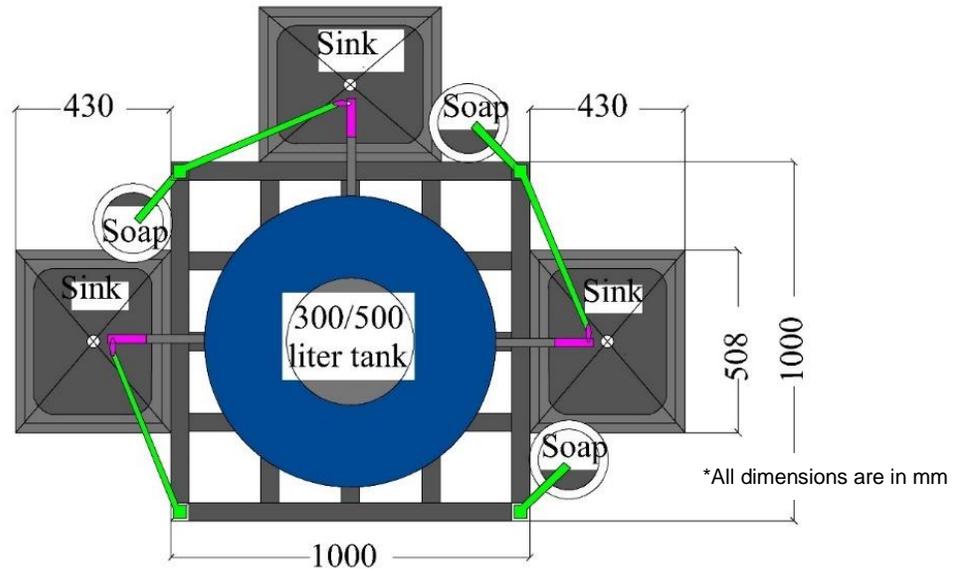


Figure 7: Different arrangement of the steep sink for multiuser

- A metal lift cock is attached with necessary plumbing accessories for water dispensing for each option (Figure 8).
- Place a tank 300 or 500 liter connected with running water. Additionally, a hose pipe and clamp are needed for drainage connection

After fixing all plumbing accessories for water supply connection and drainage the station is ready for use (Figure 8)

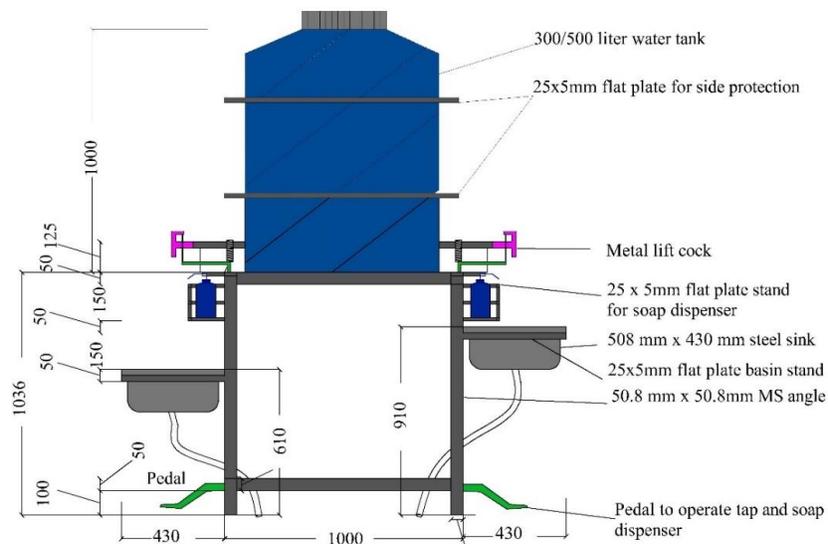


Figure 8 Multi-user inclusive large pedal operated handwashing station

Unit Cost: 26,000 BDT or 305 USD (for 3 users) approx.

*All dimensions are in mm

Technical Notes on pedal operational arrangement:

- It is always recommended to use the material locally available. The basin, water dispenser or any other component could be modified or replaced with the easy to use and locally available options for any of the options. (Photo 5 & 6)
- The pedal operation could be arranged in either upward or downward action as required. The example here in the document described the downward action by fixing the one end of the pedal with a simple hinge. But If the pedal is connected as lever with a support as fulcrum and the other end is made free the pedal will work upward direction. (Photo 3).
- The push shower could be replaced by metal lift cock or any other lever type cock. The upward or downward pull then can be reversed by using a simple lever arrangement if required. (Photo 4)



Photo 3: Pedal arrangement working upward direction and the lift cock is directly getting upward push for water dispensing



Photo 4: Pedal working downward direction but the lift cock is getting upward push by a lever action



Photo 5 Pedal operated handwashing station using Plastic basin and tap by DSK in Chattogram slum



Photo 6 Pedal operated handwashing station using ceramic basin and lift cock by DSK in Dhaka

**Case study:
Handwashing
stations with
rainwater
harvesting
system**

Now, WAB has installed handwashing station responding COVID-19 to ensure frequent handwashing practiced by the people. As Bangladesh is one of the densely populated country it will require a huge amount of water to ensure the frequent handwashing by all. The pedal operated handwashing station will

reduce the amount of water use per handwashing. Also, to bring additional water to the handwashing WAB is piloting at Greenland slum of Khulna city to include rainwater harvesting system with pedal operated handwashing stations under its COVID-19 response project.



Dual-user inclusive small pedal operated handwashing station with rainwater harvesting system at Greenland slum, Khulna, Bangladesh

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