

Dodoma OR19-10 Test Site – Atmospheric Corrosivity

Site OR19-10

Installation: 16-12-2019



Dodoma Test Site (Image by Geosun).

Background:

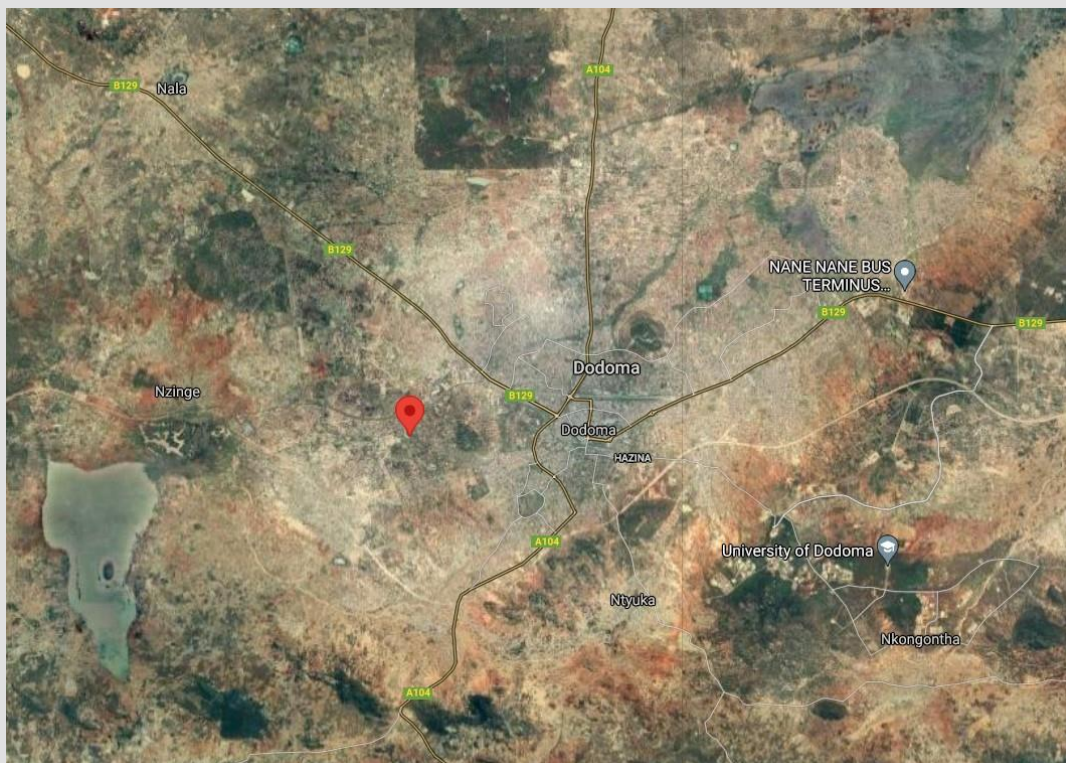
Dodoma City is positioned approximately 395-453 km west-northwest of Dar es Salaam, in the centre of Tanzania [1], with a population of more than 400 000 [2]. It is the capital city of the country and the headquarters of the Dodoma Region [2]. The area exhibits a semi-arid climate [3], which, per the Köppen-Geiger system, is classified as BSh (Mid-Latitude Steppe and Desert Climate) [4]. The economy is mainly agriculture-based [5].

The corrosion monitoring test site is positioned near a large power plant on the city's western side, towards Lake Sulunga (Bahi Swamp) [2]. The average yearly temperature for the site is $23.0 \pm 1.6^{\circ}\text{C}$, fluctuating between 17.4°C and 27.0°C , and the mean annual humidity level near $80.4 \pm 11.9\%$. The precipitation level is ~ 986 mm per annum, with the driest months spanning from May to October. The average wind speed at the site is 2.5 ± 1.0 m/s, with gusts of 4.5 m/s, in a predominant southerly direction.

From an atmospheric corrosivity perspective, the site is classified as Low (mid-C2), with the corrosion mainly due to burning of fossil fuels.

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Google Inc Map of Dodoma in Tanzania [2].

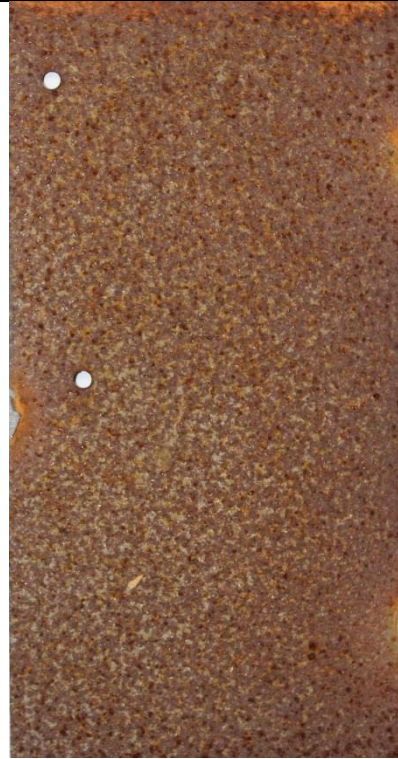
GPS Coordinates of Site:	6°10'48.0"S 35°42'00.0"E	Elevation above Sea Level (m):	1141 m	Distance from Ocean (km):	~350 km
ISO 9226 Corrosion Rates and ISO 9223 Corrosivity Classification					
R_{CORR} Mild steel (µm/yr)	10.39 ± 0.36 µm/yr (1 st year) and 7.87 ± 0.13 µm/yr (2 nd year)				
R_{CORR} Aluminium (µm/yr)	<0.1 µm/yr (Negligible) (1 st and 2 nd year)				
R_{CORR} Hot Dip Galvanised Steel (µm/yr)	0.54 ± 0.09 µm/yr (1 st year) and 0.26 ± 0.01 µm/yr (2 nd year)				
R_{CORR} Copper (µm/yr)	0.41 ± 0.04 µm/yr (1 st year) and 0.36 ± 0.07 µm/yr (2 nd year)				
ISO 9223 Corrosivity Classification	Low (mid-C2)				
Typical surface contaminants	Pollution - mainly sulphur- and nitrogen-based Specific contaminants include: Water-soluble salts – 13-15 mg/m ² Chlorides – Not detected pH – Slightly acidic (6.2-6.6)				

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Mild steel – 12 months



Mild steel – 12 months

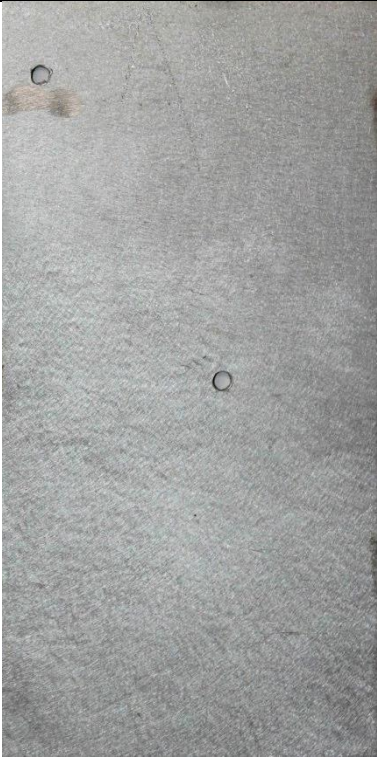


Mild steel – 24 months

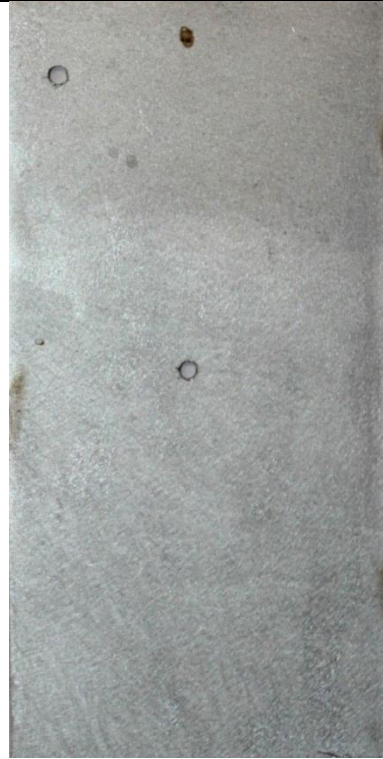


Mild steel – 24 months

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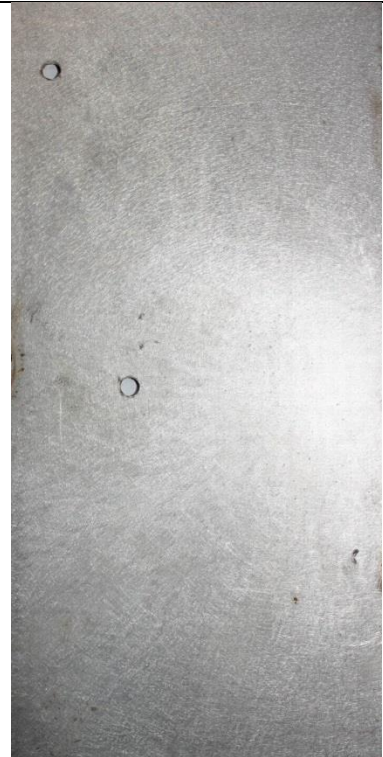
Aluminium – 12 months



Aluminium – 12 months



Aluminium – 24 months



Aluminium – 24 months

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HDG – 12 months



HDG – 12 months



HDG – 24 months



HDG – 24 months

Dodoma OR19-10 Test Site – Atmospheric Corrosivity



Copper – 12 months



Copper – 12 months



Copper – 24 months



Copper – 24 months

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Works Cited

- [1] Google Inc, "Google Maps," 28 April 2021. [Online]. Available: <https://www.google.com/maps/place/6%C2%B010'48.0%22S+35%C2%B042'00.0%22E/@-6.1766236,35.7129234,28118m/data=!3m1!1e3!4m5!3m4!1s0x0:0x0!8m2!3d-6.18!4d35.7>. [Accessed 28 April 2021].
- [2] Wikipedia, "Dodoma," 21 April 2021. [Online]. Available: <https://en.wikipedia.org/wiki/Dodoma>. [Accessed 28 April 2021].
- [3] C. Shemsangaor, "Statistics in Climate Variability, Dry Spells, and Implications for Local Livelihoods in Semiarid Regions of Tanzania: The Way Forward," in *Lackner M. (eds) Handbook of Climate Change Mitigation and Adaptation*, Springer, Cham, 2016, pp. 801-848.
- [4] Weatherbase, "Dodoma, Tanzania," 2021. [Online]. Available: [https://www.weatherbase.com/weather/weather-summary.php3?s=26836&cityname=Dodoma,+Tanzania#:~:text=The%20K%C3%B6ppen%20Climate%20Classification%20subtype,F%20\(25%C2%B0C\)..](https://www.weatherbase.com/weather/weather-summary.php3?s=26836&cityname=Dodoma,+Tanzania#:~:text=The%20K%C3%B6ppen%20Climate%20Classification%20subtype,F%20(25%C2%B0C)..) [Accessed 28 April 2021].
- [5] Encyclopaedia Britannica, "Dodoma," [Online]. Available: <https://www.britannica.com/place/Dodoma>. [Accessed 28 April 2021].