

Note on the Ground Cracks in Kadalundi Panchayath, Kozhikode

(Reference: Govt. Letter No. 22718/K1/2013/DMD dated 23/04/2013)

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Introduction

On 22.04.2013, Honb'le Minister for Revenue and Disaster Management telephonically directed Dr. Sekhar L. Kuriakose, Head (Scientist), HVRA Cell to investigate the development of unusual ground cracks at Kozhikkalam Thazheparambu near Mannur Prabhodhini in Kadalundi Panchayat while he was travelling from Kannur to Malappuram as part of the District Level Drought Review meetings chaired by Honb'le Chief Minister. The District authorities vide Fax message no F3/12/22293/11 dated 22.04.2013 also had informed Centre for Earth Science Studies about the phenomenon and requested the service of Scientists from the institution to investigate and alleviate the local community from their fears regarding, the event. Shri. John Mathai, Scientist G was assigned from CESS to investigate the event. Officials of Kadalundi Gramma Panchayat were also present during the investigations.

Description

Ground cracks were observed in an area of about 0.25km² mostly around eleven dwelling units. The cracks are discontinuous and oriented mostly in northeast direction. A few of them were oriented in ENE-WSW direction. The horizontal separation is limited to one or two cm. The extension of the cracks into the building resulted in minor cracks to the floor and walls of houses. The windows and door frames have been visibly separated from the walls but with very minor displacement only. One of the houses belonging to, Shri. Anil Kumar C.K. showed a tilt of the wall in the NW and SE corner by about 5 cm. Sub horizontal cracks were also noticed in the wall. Another house owned by Smt. Sumathi has also developed visible cracks on the NW corner of the building with the walls and floor exhibiting slight displacement. Most of the houses did show some evidences of hairline cracks developed recently. The local people have testified that the event was noticed from 20.04.2013 and continued till 22.04.2013. As such the damages excepting the two houses mentioned are minor. The two houses mentioned may need some reinforcement to the walls. However they need not be evacuated as the dwelling units are still intact.

It is seen that the ground cracks have developed in an area that has been reclaimed for settlement. The area was originally a marshy land with shallow water table condition. The general elevation of the area is less than 10 m amsl and the drainage is mostly to northeast. The northern, western and southern flanks are elevated laterite capped mounts. The substrate is mostly a thick bed of organic rich clay resting on laterite basement. Most of the wells reaching up to 5-6 m below ground level are nearly dry. The ground cracks are mostly seen on the periphery of the original marshy land. The land appears to have subsided as evidenced from the tilt in the building and slight separation with difference in elevation at the basement of manmade structures with the ground. Pictures of the cracks and damages to the houses are given as appendix.

Ground vibrations caused by earth tremors are a common cause of ground cracks, cracks to buildings and slight ground subsidence. The earthquake records at Peechi seismic stations were perused for tremors in

the area. On these days tremors were not recorded from this area or its vicinity. Hence earthquakes are not the cause of this phenomenon. Aseismic creep is another reason for this kind of ground cracks. However it is often followed by unusual sound from depth, abnormal changes in water level, wavy motions in wells, formation of froathy layer with expulsion of air etc. Such observations were not reported from this area. Hence the present phenomenon cannot be related to earth tremors or other related movements.

Decline in water level in the region is another cause of ground fissures and subsidence. The area has witnessed lowering of water level due to the unprecedented drought like situation faced during the summer of 2013. Some of the wells resting on laterite are dry. Heavy pumping is also resorted to by those with perennial wells mainly for watering plants. In additions it was pointed out that many new bore wells have come to operation in the area. When the water table is lowered to below the clay layer there is a tendency for it to shrink. Clay layer swell when saturated with water and shrink when it loses water. Hence the only reason for the ground cracks and subsidence to occur in this area is due to the shrinkage of under lying clay layer that is seen extensively in the low lying area. **The phenomenon can aggravate if the extraction of water from this region is unchecked.**

Conclusion

In conclusion, it can be stated that excess draining of water from the clay substrate has caused shrinkage with slight ground subsidence and emergence of cracks especially in the peripheral region of the low lying area. This can aggravate under uncontrolled pumping of water from the region during a drought period. Two dwelling units appear to be affected and may require additional maintenance. As such they are not unsafe, but may be verified by a competent structural engineer.

Appendix



Black clay from a recently dug open well which swells and contracts with the presence and absence of water



Ground cracks



Ground cracks



Damage to walls of houses



Damage to walls of houses