ANALYSIS OF THE IMPACT OF EARTHQUAKES ON THE RELIABILITY OF UNDERGROUND PIPELINES

Mukhtorov Sherzod Sobirjon ugli
Fergana Polytechnic Institute

Srojidinov Jurabek Ravshanjon ugli
Fergana Polytechnic Institute

ANNOTATION

The problem of ensuring high reliability of utilization and treatment of wastewater from the population is currently relevant in connection with the rapid growth of water consumption and, consequently, the increase in the volume of wastewater. Sewage networks play an important role in solving the problem of ensuring the reliability of the sewage system. Particular attention should be paid to the reliability of drainage networks in areas prone to seismic impact, as in some cases accidents in them cause more damage than earthquakes themselves. In areas prone to seismic impact, special attention should be paid to the reliability of drainage networks, as in some cases accidents in them cause more damage than earthquakes themselves.Therefore, seismic zones are taken into account in the process of laying the networks.

Keywords: Drainage, seismic.

INTRODUCTION

Analysis of the impact of earthquakes on the reliability of underground pipelines.

In case of earthquakes, especially strong ones, engineering communications lose their work partially or completely for a certain period of time, which leads to interruptions in the operation of water supply, sewerage, gas supply and electricity supply systems. will bring. The normal operation of water supply systems after earthquakes allows the localization of fire sources, which is much larger than the damage caused by an earthquake. The uninterrupted operation of sewerage systems, and in particular sewerage networks, plays an important role in protecting the environment and the watershed, in addition to providing the necessary convenience for the population and the normal operation of industrial enterprises. Earthquakes happen on our planet every five minutes. Every year - 94 catastrophic earthquakes with a magnitude of 8 to 10. It is one of the seismic regions of our country. Here invisible [less than 2 points] tremors 6-7 times a day, weak [2-3 points] - monthly, average [4-5 points] - every year, strong [6-7 points] - once every few years times are recorded. The materials of the reports and monographs provide very little information about the effects of strong earthquakes on buildings and structures and the impact of earthquakes on underground utilities and, in particular, drainage networks. Only some foreign and domestic cases have highlighted these issues. Such foreign works include the Reports of the Seismological Committee of Japan on the Consequences of the 1923 Earthquake. provide relevant information. In particular, these issues were highlighted in Yasuhiko Kobayashi's speech at the 1974 International Congress on Water Supply in London. Based on the analysis, the damage characteristics of the pipes were

GALAXY INTERNATIONAL INTERDISCIPLINARY RESEARCH JOURNAL (GIIRJ)
ISSN (E): 2347-6915
Vol. 10, Issue 1, Jan. (2022)

determined depending on their location, laying conditions, as well as the material and design of the pipe sensor joints. Serious damage was observed in the pipelines laid on soft soils. Fractures of round joints, cracks in pipelines, etc. were noted. An earthquake in Tokyo on September 1, 1923 caused fires and destroyed not only surface structures but also underground utilities, which is explained by the vertical and horizontal deformation of the soil. At the time of the quake, Tokyo's steel and cast iron water supply networks were 977.4 km long and 114.94 km long with a diameter of up to 600 mm. made of reinforced concrete pipes of circular and ovocdal section. Pipes with a diameter greater than 600 mm are made of concrete, reinforced concrete and walls.

A seismic scale is a table used to estimate (measure) the strength (intensity) of vibrations that occur at the surface during an earthquake. Vibration strength is assessed based on the extent and shape of the residual deformation (change) in the soil, the degree of damage to buildings and structures, and other external factors.

Drainage, drainage of agricultural lands - see. x. engineering method of reclamation; system of hydraulic structures for the removal of excess soil-groundwater and soluble toxic salts from the soil layers, which interfere with the normal development of crops.

After an earthquake in San Francisco in April 1906, cracks, landslides, swollen cracks, and landslides were observed. Many accidents in water supply networks; the sewerage and other communications recorded after the earthquake were caused by significant subsidence of the filled soils as the city was built in dry swamps and filled with ravines. The number of accidents on hard soils was much lower than on larger ones. The total number of cracks and fissures in the water supply and sewerage networks caused by the earthquake in San Francisco was 300, with a network length of 554.5 km. However, the accident rate from the earthquake was 0.54 av / km, which should be considered high for the city's water supply and sewerage system. Unfortunately, the report does not provide accurate information on accidents in the sewer system. The devastating effects of the San Francisco earthquake have spread to many nearby cities: Alameda, Barqueley, Auckland, Santa Rosa and other settlements. The magnitude of the earthquake in these cities reached b points. The water intake facilities were not severely damaged, but cracks and joints in the pipes of the water supply and sewerage networks, which were laid on loose soils, were damaged. Their level of damage is insignificant because the water supply of the cities has not been cut off. An interesting conclusion drawn in this regard by the authors of the Report on the aftermath of the earthquake in San Francisco: "The experience of cities in the East Gulf, as well as the experience of San Francisco," allows us to conclude. well-built water supply and sewerage networks on a good foundation, i.e. .e. in dense soils they are more resilient and resistant to earthquakes, as exemplified by the water supply and sewerage networks built on dense soils in Santa Rosa and not severely damaged. On June 29, 1925, a strong earthquake of magnitude 8-9 in Santa Barbara caused the destruction of nearly 50% of the buildings in the city, and this did not cause such serious damage to the water. water intake structures, only the demolition of the 150-meter section of the dam, led to the erosion of water pipes with a diameter of 750 and 900 mm with cracked water. observed. The lack of necessary information in the “report” of the Santa Barbara earthquake on the damage to water supply and sewerage networks does not allow us to draw a definite conclusion about the extent of its

impact on the damage to these pipes. In June 1929, and then in February 1931, as a result of a catastrophic earthquake in New Zealand, drainage networks made of ceramic and concrete pipes were severely damaged at different soil boundaries, in their places. solid burial with foundation. In addition, deformation of the soil led to changes in the slope of the drainage network and the appearance of opposite slopes . Analysis of the consequences of strong earthquakes, both in our country and abroad, shows that the underground pipes for various purposes lead to significant destruction. Typical types of damage to underground pipelines include: cracks and fractures of both the pipes themselves and the joints; longitudinal cracks in pipes; transverse tears; cutting pipes at hard compression points; turn coverage; fracture of the valve body; flanges, bolts and other types. In pipelines laid on soft soils [peat bogs, swampy bases, filled soils, etc.], at different soil boundaries, on non-horizontal sections of pipelines (slopes, uneven surfaces, bends) etc.] serious injuries are observed).
Damage to pipelines is often caused by pipes floating in moist soils, sandy soils with high groundwater levels, and joints damaged as a result of “sand flow”. Small-diameter pipes made of different materials were severely affected by the earthquake. The main amount of damage was observed in areas of strong soil deformations, as well as when the pipeline coincided with the direction of seismic waves. The impact of strong earthquakes on water supply networks was studied in the work of RM Mukurtumov on the example of the results of the Ashgabat earthquake in 1948, who for the first time devoted an important part of his research to the relationship. the depth of the networks and the degree of damage caused by their earthquakes. The effects of the 1966 Tashkent earthquake on the water supply and sewerage system were studied by VA Kryzhenkov, who first determined that the number of destroyed joints depended on the internal average. the pressure in the water supply network, as well as the average failure rate of pressure pipes depend on the size of their diameters. He obtained empirical formulas to determine the reliability indicators depending on the diameter of the water supply network the = *f* [d] and t_b = *f* [d], which allows to determine the limits of variation of the fault flow parameter. Using them in optimizing design solutions. Changes in reliability parameters for the seasons were identified, and dependencies were obtained that allowed to predict the number of accidents and to plan the volume of planned maintenance and repair work; the effect of earthquakes of point b or less on the reliability of the elements of water supply networks. Dependencies were obtained that made it possible to determine the effects of both tangible and intangible earthquakes. Thus, the analysis of the impact of earthquakes of different intensities on water supply networks shows that the latter is catastrophic. weak [gravity] and given that the pipes used for them do not have mechanical strength, so they are prone to damage and destruction during earthquakes of varying intensity. This is evidenced by the materials of a number of reports devoted to the engineering analysis of the consequences of strong earthquakes. During the 1966 Tashkent earthquake, the length of the drainage network, consisting of ceramic, asbestos-cement, cast iron and reinforced concrete pipes with a diameter of 150 to 1,700 mm, was 258 km. Analysis of accidents in ceramic pipe drainage networks showed that the highest level of accidents occurred in pipes with a diameter of 150 mm and a depth of 3.06 av / km, a depth of 1.0-2.0 m and the number of accidents in the pipes was 2.7 av / km with a diameter of 200 mm and a depth of 2.0-3.0 m. The main types of destruction of

drainage networks were damage to joints with a tight seal and pipe fractures. Research has shown that the main factor influencing the breakage of pipes during an earthquake is strong shear forces under the influence of vertical seismic loads. lgan. Other reasons for the destruction of ceramic pipes include: intersection with other engineering networks [29.5% of the total number of registered cracks]; cracks in unconnected tunnel crossings [20.6%], violation of SNiP requirements [17.6%] and geological conditions (laying of pipes in cast and submerged soils 23.5%). The analysis shows that the nature of damage in seismic drainage networks with seismic impact and the form of their manifestation depends mainly on the design, laying conditions, pipe materials and so on. Therefore, it is of great practical importance to study the impact of earthquakes of different intensities on the performance of drainage network elements and methods of their quantitative assessment. The analysis of the impact of earthquakes on underground pipes mainly includes data related to mechanical damage to the pipes. Fracture of pipes, breakage of round joints, formation of longitudinal cracks in the body of the pipeline are the effects of strong and catastrophic earthquakes.

Practical practice shows that sewer networks often face faults due to the appearance of obstructions. The number of accidents of this type is more than 80% of their total. Therefore, the uninterrupted operation of sewer networks is mainly determined by the faults associated with the blockage of the pipeline section. In addition, the number of strong and destructive earthquakes is low. However, in areas affected by seismicity, there are many invisible earthquakes with an intensity of up to 2 points, which do not lead to failure of the elements of the drainage network during their occurrence. There is no doubt that such earthquakes with low levels of severity should have a certain impact on the state of emergency of sewer networks. However, there is no data in the domestic and foreign technical literature on the formation of blockages and turbidity of pipelines, both in terms of the degree of impact of insensitive earthquakes on the elements of drainage networks, and in terms of mechanical strength. An analysis of the literature conducted in this review shows that to date, no research has been conducted to assess the reliability of drainage networks in working conditions, both in our country and abroad. Reliability indicators do not have numerical values that describe their quality of work. No correlations have been identified linking the reliability parameters with the characteristics of the pipelines, which does not allow a comparative analysis of the performance of drainage network elements under different operating conditions, assessing the impact of a number of factors on the reliability of network elements.

REFERENCES

1. Axmadbek Maxmudbek o‘g‘li Turg‘unbekov, & Abdumajidxon Murodxon o‘g‘li Muxtorov (2021). Theoretical Studies Of The Technological Process Of Machining Parts With Concave Surfaces Of Complex Forms On Cnc Milling Machines. Journal of Innovations in Social Sciences 1(1) ,90-97.
2. Turg‘unbekov Axmadbek Maxmudbek o‘g‘li (2021). THEORETICAL STUDIES OF THE TECHNOLOGICAL PROCESS OF MACHINING PARTS WITH CONCAVE SURFACES OF COMPLEX FORMS ON CNC MILLING MACHINES. 1(8), 122-128. https://doi.org/10.5281/zenodo.5710406

3. Alisher Axmadjon o'g'li Botirov, & Axmadbek Maxmudbek o'g'li Turg'unbekov. (2021). EXPERIMENTAL STUDIES OF THE TECHNOLOGICAL PROCESS OF PROCESSING CONCAVE SURFACES OF COMPLEX SHAPES. Eurasian Journal of Academic Research, 1(8), 222–231. https://doi.org/10.5281/zenodo.5727625
4. Botirov, Alisher Akhmadjon Ugli , & Turgunbekov, Akhmadbek Makhmudbek Ugli (2021). INVESTIGATION OF PRODUCTIVITY AND ACCURACY OF PROCESSING IN THE MANUFACTURE OF SHAPING EQUIPMENT. Oriental renaissance: Innovative, educational, natural and social sciences, 1 (11), 435-449.
5. Abdullayeva, Donoxon Toshmatovna, & Turg'Unbekov, Axmadbek Maxmudbek O'G'Li (2021). ПРОДЛЕНИЕ СРОКА ХРАНЕНИЯ ЛИСТОВЫХ ДЕТАЛЕЙ ПРОКАТНОГО ОБОРУДОВАНИЯ. Oriental renaissance: Innovative, educational, natural and social sciences, 1 (11), 1035-1045.
6. I. O. Ergashev, R. J. Karimov, A. M. Turg'Unbekov, & S. S. Nurmatova (2021). ARRALI JIN MASHINASIDAGI KOLOSNIK PANJARASI BO'YICHA OLIB BORILGAN ILMIY TADQIQOTLAR TAHLILI. Scientific progress, 2 (7), 78-82.
7. Ахмадбек Махмудбек Ўғли Турғунбеков (2021). НОТЕХНОЛОГИК ЮЗАНИНГ ТЕШИКЛАРИГА ИШЛОВ БЕРИШДА ДОРНАЛАШ УСУЛИНИ ТАДБИҚ ЭТИШ. Scientific progress, 2 (1), 4-10.
8. Abdumajidxon Murodxon O'G'Li Muxtorov, & Axmadbek Maxmudbek O'G'Li Turg'Unbekov (2021). VAKUUM XALQALARI UCHUN SILIKON MATERIALLARNI TURLARI VA ULARNING TAHLILI. Scientific progress, 2 (6), 1503-1508.
9. Kholmurzaev, A. A., & Tokhirov, I. K. (2021). The active participation of students in the formation of the educational process is a key to efficiency. ACADEMICIA: An International Multidisciplinary Research Journal, 11(4), 435-439.
10. Абдукаримов, Б. А., & Тохиров, И. Х. (2019). Research of convective heat transfer in solar air heaters. Наука, техника и образование, (9 (62)).
11. Арзиев, С. С., & Тохиров, И. Х. Ў. (2021). ФАЗОВИЙ ФИКРЛАШНИНГ БЎЛАЖАК МУҲАНДИС ВА АРХИТЕКТОРЛАР ИЖОДИЙ ФАОЛИЯТИДА ТУТГАН ЎРНИ. Scientific progress, 2(2), 438-442.
12. Холмурзаев, А. А., Тохиров, И. Х. У., & Охунжонов, З. Н. (2019). Движение летучки хлопка-сырца в зоне от вершины колка до отражающего козырька. Проблемы современной науки и образования, (11-2 (144)).
13. Усманов, Д. А., Каримов, Р. Х., & Полотов, К. К. (2019). Технологическая оценка работы четырехбарабанного очистителя. Проблемы современной науки и образования, (11-1 (144)).
14. Холмурзаев, А. А., Алижонов, О. И., Мадаминов, Ж. З., & Каримов, Р. Х. (2019). Эффективные средства создания обучающих программ по предмету «Начертательная геометрия». Проблемы современной науки и образования, (12-1 (145)).
15. Абдуллаева, Д. Т., Каримов, Р. Х., & Умарова, М. О. (2021). МАКТАБ ТАЪЛИМ ТИЗИМИДА ЧИЗМАЧИЛИК ФАНИНИ РИВОЖЛАНТИРИШ ВА БИЛИМ БЕРИШ ЖАРАЁНИНИ ТАКОМИЛЛАШТИРИШ. Scientific progress, 2(1), 323-327.

16. Валихонов, Д. А. Ў., Ботиров, А. А. Ў., Охунжонов, З. Н., & Каримов, Р. Х. (2021). ЭСКИ АСФАЛЬТО БЕТОННИ КАЙТА ИШЛАШ. Scientific progress, 2(1), 367-373.
17. Todjiboyev R.K., Ulmasov A.A., & Muxtorov Sh. (2021). 3M structural bonding tape 9270. Science and Education, 2 (4), 146-149.S
18. Холмурзаев, А. А., & Охунжонов, З. Н. (2019). ДВИЖЕНИЕ ЛЕТУЧКИ ХЛОПКА-СЫРЦА В ЗОНЕ ОТ ВЕРШИНЫ КОЛКА ДО ОТРАЖАЮЩЕГО КОЗЫРЬКА. Проблемы современной науки и образования, (11-2), 19-21.
19. Muxtoralievna, R. M., Nosirjonovich, O. Z., & Zafarjonovich, M. J. (2020). Use of graphics computer software in the study of the subject" Drawing and engineering graphics". ACADEMICIA: An International Multidisciplinary Research Journal, 10(5), 83-86.
20. Валихонов, Д. А. Ў., Ботиров, А. А. Ў., Охунжонов, З. Н., & Каримов, Р. Х. (2021). ЭСКИ АСФАЛЬТО БЕТОННИ КАЙТА ИШЛАШ. Scientific progress, 2(1), 367-373.
21. Arziyev, S. (2021). ADVANTAGES OF USING THREE-DIMENSIONAL VISUAL VIEWS IN TEACHING THE SUBJECT «DESCRIPTIVE GEOMETRY». Збірник наукових праць SCIENTIA.
22. Arziyev, S. (2021). ADVANTAGES OF USING THREE-DIMENSIONAL VISUAL VIEWS IN TEACHING THE SUBJECT «DESCRIPTIVE GEOMETRY». Збірник наукових праць SCIENTIA.
23. Арзиев, С. С., & Тохиров, И. Х. Ў. (2021). ФАЗОВИЙ ФИКРЛАШНИНГ БЎЛАЖАК МУҲАНДИС ВА АРХИТЕКТОРЛАР ИЖОДИЙ ФАОЛИЯТИДА ТУТГАН ЎРНИ. Scientific progress, 2(2), 438-442.
24. Zulfiya, B., Rakhmonali, S., & Murodjon, K. (2021). A BRIEF HISTORY OF THE DEVELOPMENT AND TEACHING OF DRAWING SCIENCE IN UZBEKISTAN.
25. Karimov, R. (2021). PLANNING OF BELT BRIDGE FOR UNSYMMETRICAL PROGRESSIVE STAMPING. Scientific progress, 2(2), 616-623.
26. Karimov, R. J. O. G. L., & Toxtasinov, R. D. O. (2021). FEATURES OF CHIP FORMATION DURING PROCESSING OF POLYMER COMPOSITE MATERIALS. Scientific progress, 2(6), 1481-1487.
27. Karimov, R. J. O. G. L., O'G'Li, S. S. D., & Oxunjonov, Z. N. (2021). CUTTING HARD POLYMER COMPOSITE MATERIALS. Scientific progress, 2(6), 1488-1493.
28. Mamajonovich, X. A., Omonbekovna, U. M., & Toshmatovna, A. D. (2020). The rectification of curve flat arch. ACADEMICIA: An International Multidisciplinary Research Journal, 10(5), 62-65.
29. h. (2021). 3M structural bonding tape 9270. Science and Education, 2 (4), 146-149.