IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

RECTIFICATION OF TILT- SHIFT IN DOUBLE-D TYPE WELL FOUNDATION

[1] Dilip Patidar, [2]Ankit Panjwani,

[1] Student, M. tech, Structural Design, [2] Student, M. tech, Structural Engineering,
[1] Department of Civil Engineering, [2]Departmennt of Civil Engineering,
[1] Prashanti Institute of Technology& Science, Ujjain, India, [2] Jabalpur Engineering College, Jabalpur, India

Abstract: Well foundations are a robust and preferred foundation in India for river bridges and are quite appropriate foundation for alluvial soil in river and creek where depth of scour can be very large. In Indian technique of well foundation for design and construction is quite well developed since, a long time, still there are situations where serious problems are encountered at site during construction of well foundations, one of the important problem identify here and rectified in this paper.

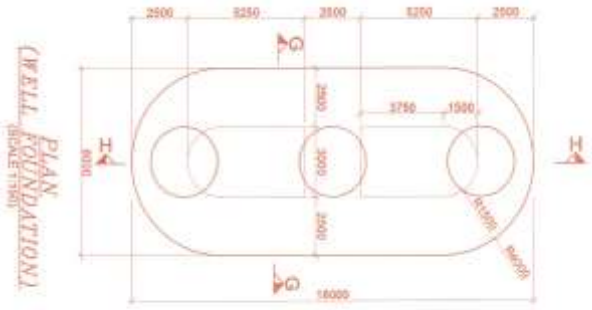
Keywords: **Well Foundation, Sinking of well Foundation, Tilt & Shift, Eccentric loading (Kentledge) Method**

I. INTRODUCTION

When the loads from the superstructure are very high and the soil bearing stratum is not sufficient to bear load, it does not have the sufficient bearing then, we need to go for deep foundation, so well foundation is one of that type of deep foundation. It is useful in the situation where the loads have to be transferred to the soil strata, which are deep below from the ground surface like in case of bridge foundation. Well foundation is the most commonly adopted foundation for major bridges in India. It has been used for monuments also. Taj Mahal at Agra is one such example. It is also useful in foundation where uplift loads are quite high as in the case of transmission like towers. Due to the large cross-sectional area of well foundation, the bearing capacity of soil for that area is much higher. Well foundation being hollow at the center has large section modulus with min. sectional area which imparts great stability to well foundation. In this paper we discussing one out of 15 well foundation constructed for Railway Bridge over Chambal River near Dholpur. Some of the difficulties faced during construction and rectified meanwhile under construction of well.

II. SPECIFICATION

Shape of well foundation: Double -D type
Size of well: 18m*8m
Depth of well: 30 m
Method of sinking adopted: Dredging by grab.
Type of soil strata: Initially Sand up to 8m to 10 m from OGL and then hard stiff clay up to FDL i.e. 30m



Sinking of well is an important activity during construction. Since it is not possible to Sink whole well in one operation so casting of well staining is done in several lifts (2.5 m each) . Then sinking operation is processed and again after sinking of one lift casting is next lift processed. Meanwhile different type of soil strata encounter below ground level during sinking of well, While sinking tilt and shift to be maintain since An important aspect of well foundations is that the tilt should be less than 1%(1in 100) and shift should be D/40 or

maximum 150 mm as far as possible. However the wells do get tilted much beyond the desired value even after all care has been taken while sinking the well which results in excessive tilt or shift of well in a particular direction.

Sinking of well: The process of taking down the well to the founding level is known as well sinking.
Tilt: When the well is sloped against vertical alignment, it is called tilting of the well foundation.
Shift: When the well is moved away horizontally from the desired position, it is called shifting of the well foundation.

III. PROBLEM FORMUATION

During Construction of well No. 8 Railway Bridge over Chambal River same problem occur when the well is sunk up to some depth in stiff clay , well tilted over specified limits. To overcome with this problem and for correction of tilt some arrangement is advised by Engineers and same is adopted. So use of Eccentric load (kentledge) and strutting the well at same time to rectify the tilt. Initially it does have no effect of this arrangement while sinking but after sinking the well up to 1 meter tilt start to minimize and finally it comes with in limit when reaches up to FDL.

In the case of excessive tilt, regular method for tilt rectification the well .the methods normally adopted for correction of tilt and shift in the well are:

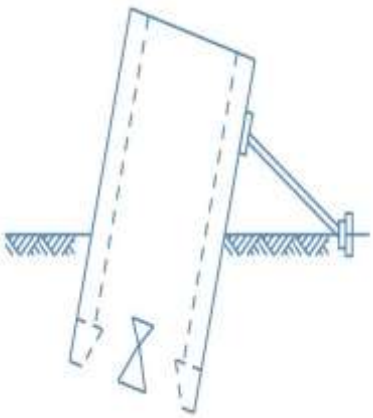
1. Eccentric loading on higher side
2. Excavation on higher side
3. Water jetting
4. Pulling the well
5. Using hydraulic jacks
6. Using struts on lower side
7. Excavation under cutting edge
8. Wooden sleeper under cutting edge

IV. PRECAUTION AND MEASURE

In this problem we have the well tilted toward Jhansi – U/S side, so we take measure and it is discussed below,

- **Provide Strut on lower Side**

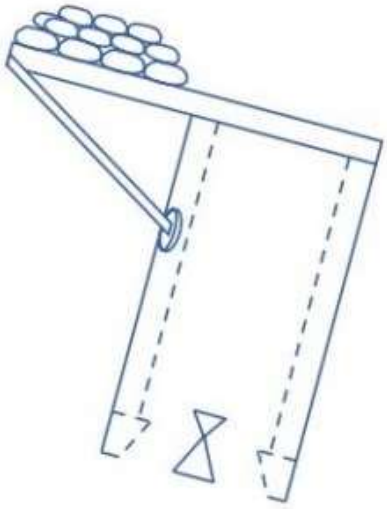
By providing struts supports on the lower side or tilted side of well, further tilting can be prevented. So Provide strut toward Jhansi side ,Initially a RCC wall is made 3m away from Jhansi face of well to support the strut , then strut (ISMB section) is placed in between RCC wall and lower face of well at suitable distance of 1.5 meter each. The angle of inclination is less than 45 degree to stable strut with face of wall. If we increase the angle then there will be no effect of strut provided. The surface of ISMB toward well side should be regular otherwise it may damage concrete while sinking due to horizontal pressure generated by well.



- **Eccentric Loading (kentledge) on higher Side**

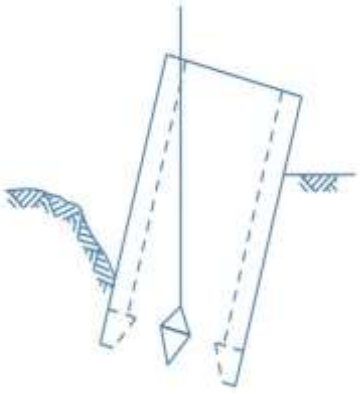
By placing eccentric loading on the higher side tilted well can be rectified. Higher side is nothing but the opposite side of tilt or lower side here we have Mathura-D/S as higher side, A loading platform is constructed on the higher side and load is placed on it. This eccentric load increase downward pressure on higher side and correct the tilt. Amount of dead load and eccentricity of apply load is decided based on the depth of sinking. If Greater is the depth of sinking of well, larger will be the eccentricity and load. Here we use approx. 280 MT dead load on well. For load we use support of ISMB, platform plate and concrete blocks.

Eccentric load calculation of well P8					
Material	**Length**	**Breadth**	**Nos**	**Unit Weight**	**Total Weight in MT**
ISMB 600	11.500		6	123	8.487
ISMB 500	13.000		7	86.9	7.908
16mm MS Plate	6.300	2	4	125.6	6.330
1250*1000 BLOCK	1.250	1	85	2400	255.000
				TOTAL WEIGHT in MT	**277.725**



- **Sinking on higher Side**

After making this arrangement sinking by grabbing is start on higher side so it will realise the pressure under cutting edge and well try to become verticle. While Sinking the well it is also ensure that do not make a high sump otherwise it may tilt the well on another side due to sudden sink.



V. RESULT AND DISCUSSION

Many type of problems come while construction of well foundation in progress and due to site practices and experiments problem can be violated at some instant, In this problem after continues operation of this method the tilt and shift rectified and comes with in specified limits. This method can be used for Double D type well as well as circular well also if required.
Also learn that while well in dynamic condition can be rectified easily as compare to static condition.

VI. REFRENCES

[1] Gauranga Prasad Saha, The sinking of well foundations in Difficult Situations.
[2] Indian Railway Bridge Manual, Ministry Of Railway
[3] Dhrubajyoti Bhattacharya, "Method for evaluation of Tilt and Shift of a well" Paper published in Vol. 41 No.7. Indian Highways, Indian Road Congress
[4] Under construction Site of Chambal Railway Bridge on Mathura-Jhansi 3rd line project, Rail Vikas Nigam Limited
[5] GPT Infraprojects Limited, Kolkata