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ON AN APPROXIMATE SOLUTION OF RECTANGULAR PLATES WITH TWO OPPOSITE EDGES SIMPLY SUPPORTED AND THE OTHER TWO EDGES FREE OR ELASTICALLY SUPPORTED.

Hiroshi Omura, C.E. Member.

Synopsis : In this paper, the author presents an approximate solution of rectangular plates with two opposite edges simply supported and the other two edges free or elastically supported, considering all edges simply supported rectangular plates as basic systems. Further, in the cases that these plates are supported with many elastic beams in the medium, the same consideration will do.

THEORY OF MATRICIES IN STRUCTURAL ENGINEERING

——Affinor and its properties——

Master of Eng., Shizuo Shimada, C.E. Assoc. Member,

Synopsis : The author describes the theory of matricies with vector and affinor analysis. New mathematical quantity "affinor" is definited in this paper as a sort of vector-product. The author maintains in the first the linear algebra by the methods of affine-transformation concerned much with numerical calculations. To determine, for example, an inverse-matrix to the given symmetric matrix is often required in engineering calculs.

The following papers will deduce affine-algebra and its application to the statics, which will make a great utility dissolve statically indeterminate structures of high order.

THE STRESS DISTRIBUTION OF THE PLATE TENSIONED BY THE LOAD ON A RIVET

By Minoru Okabayashi, C.E. Member

Synopsis : By elastic theory, the writer resolves the relation between the stress distribution and the distance from the rivet-hole, when the plate is tensioned by the load on a rivet.

ON RESIDUAL STRESS OF CAST IRON PIPE

Masakazu Usuda, C.E. Member and Yoshio Katsuta, C.E. Assoc. Member

Synopsis : In this paper, the authors introduce one of study tracing to its origin which occured again bursting accident of cast iron pipe at Hanshin Water Supply Association recently.

The authers give outline of experimental result and theoretical analysis as to residual stress of cast iron pipe.

In the large-calibre pipe, the authers confirm that can produce about 4.5 kg/mm^2 residual stress will be produced and propose that must try annealing must be tried at least.

METHOD OF FAST CONVERSION FOR SOLVING THE LINEAR SIMUTTANEOUS EQUATIONS WITH PRINCIPAL DIAGONAL COEFFICIENTS

by Takaichi Shingo, C.E. Member

Synopsis : By directly reciprocating the equations $ax=h$, which appear in numerical integration, structual analysis, etc., the far better first approximate solutions $x'=(21-a)Z'h$ than those, ever obtained, are rationally found. The ruling retroactive errors in X′ are then recurrently corrected in series, enabled to be convergent as fast as possible, in a column type table. Conventional methods of computation, such as iteration methods, cannot be used generally, because considerable errors are actually introduced into the solutions, especially when the coefficients, not situated in the principal diagonal, are large compared to the diagonal ones. Thus,the equations, practically never been solved by the existing methods other than those of climination, determinants, matrices, etc. up to the present. can perfectly be solved.

DYNAMIC WATER PRESSURES ON ARCH DAMS DURING EARTHQUAKES

Seima Kotsubo, C.E. Assoc. Member

Synopsis : The author deduced a theoretical solution of dynamic water pressures on arch dams constructed in U-shaped canyons, and computed therefrom pressures for various values of upstream face radii, central angles, and intersection angles subtended by the both banks of the rivers above the dams.

The results give values much different from the ones obtained by the ordinary two-dimensional theory.

A FEW CONSIDERATIONS ON THE EARTHQUAKE RESISTANT PROPERTIES OF THE HARBOUR PIER

——On the Distribution of Seismic Coefficient——

Dr. Eng., Motohiro Hatanaka, C.E. Member.

Synopsis : To ensure the earthquake resistant property of harbour pier, the writer has once reexamined the earthquake damages of piers due to the past large earthquakes, and emphasized that the dynamic consideration of the pier as a whole is quite necessary. He has also made the fundamental investigation on this problem by the shear vibration theory and clarified the free vibration of the harbour pier.

This paper summarizing the results obtained thereafter discusses first the forced vibration of pier and presents a proposal on the distribution of seismic coefficient (seismic intensity in the ratio to gravity) of design of pier on the basis of the results of vibration tests that were made on the actual harbour piers by the artificial earthquake.

A STUDY ON THE ESTIMATION OF UNIT PRICE IN CONSTRUCTION WORK

Osamu Nishizawa, C.E. Member, Takeshi Fukui, C.E.Member.

Synopsis : A study concerning the estimation of unit price without using the "itematized unit price (Ichi i daika hyo) "in construction work is described in this paper.

The authors propose that today's "itematized unit price (Ichi i daika hyo) "which comes from the engineers' experiences and intuition should be abolished, and, instead of it, the proposed unit price should be employed which is determined on the basis of the field conditions.

Then, they try to determine the proposed unit price by maximizing the correlation coefficient between actual unit prices and corresponding field conditions.

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