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Simplified calculation method for serviceability deflection of edge supported slabs; Part 2: Coefficient method

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ABSTRACT: Calculation of design moments are based on coefficient method for edge supported slab systems. The design procedure for edge supported slabs lacks from the checking of the serviceability deflection of slabs using simple techniques like the calculation of strip moments using coefficient. A companion paper summarised the methods available for calculating slab deflection, described the development and verification of a finite element model for simulating slab response. The model so verified has been employed in this paper for conducting parametric studies for deflection of slab centre for various support cases and span rations. These have been consolidated into tabular form which forms the basis for calculating the slab deflection using coefficient method and forms a method that is consistent with the moment coefficient method of ACI. Results obtained using the proposed method have also been compared with Finite Element results for continuous slab systems. Finally a comparison of slab deflection for various span ratios and support cases have been performed with some of the available methods.

KEYWORDS: Deflection, edge supported slab, coefficient method, strip moment, ACI method

INTRODUCTION

It has been shown in a companion paper (Ahmed and Chowdhury, 1999) that there are several methods available for the calculation of deflection of the edge-supported slabs. It was observed that the available methods are either very difficult to use (Lavey and Simpson described by Ugral 1981, Chang and Hwang 1996, Polak 1996,Vanderbilt et al 1965) or oversimplifies the conditions (strip method described by Ugral, 1981, ACI method 1995). A companion paper described the development and verification of a FE model using ANSYS to simulate slab response. Results obtained from the FE model was converted into strip method of the ACI moment coefficient. This has been used to verify the FE result with ACI results by extracting results for various span ratios and all the nine support conditions. Results presented in the companion paper shows that the model can represent the behaviour of edge supported slab with sufficient accuracy. This paper utilises the developed model, to study the deflection pattern of such slabs under various conditions, results of which has been consolidated to develop a simple procedure to calculate the deflection in away similar to the moment calculation procedure.

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PARAMETRIC STUDY OF SLAB DEFLECTION

A companion paper described the development and verification of numerical model for edge supported slabs. The verified model is used in this section to study the deflection behaviour at the centre of the slab considering few selected parameters.

Selection of parameters

For parametric study, the following parameters have been selected:

- Thickness of slab
- Applied load
- Reinforcement ratio
- Support conditions
- Span ratio

Thickness of slab

ACI code specifies that for edge supported two way slabs the thickness of the slab should be the larger of: 90 mm (3.5 inch) when the average value of ratio of flexural stiffness of beam section to flexural stiffness of a width of slab bounded laterally by centrelines of adjacent panels (if any) on each side of the beam (α_m) greater than 2.0. For (α_m) between 0.2 and 2.0 the thickness should be larger than 125 mm. Thus the lower thickness has been kept to this magnitude (90 mm) for all the cases. The upper limit of thickness for parametric study selected is 508 mm (20 inch).

Applied load

For residential building in case of private rooms and corridors a load of 1.916×10^{-3} N/mm^2 (40 psf), for residential apartments armouries and drill rooms a load of 7.185×10^{-3} N/mm^2 (150 psf), corridors of hospital above the first floor a load of 3.83×10^{-3} N/mm^2 (80 psf), stack rooms of libraries not less than a load of 7.185×10^{-3} N/mm^2 (150 psf) has been specified in ANSI A58.1-1982. From this consideration the range of loading on the slab has been selected from 1.916×10^{-3} N/mm^2 to 9.58 N/mm^2 irrespective of support condition and slab thickness. The self-weight of the slab has been considered separately from slab thickness.

Reinforcement ratio

As per ACI code (1995) the minimum reinforcement ratio considering temperature and shrinkage is 0.002. For parametric study the reinforcement ratio has been varied from 0.002 to 0.05. Due to limitation of the FE software the reinforcement ratio has been kept same in both directions.

Support conditions

To maintain similarity with the ACI moment coefficient method the nine support cases as classified by ACI method have been selected for the study.

Span ratio

Slabs span ratios of 0.5 to 1.0 have been selected.

Modelling reinforcement ratio

Shell element of ANSYS is not capable of modelling reinforcement; i.e., reinforcement option is not incorporated, in the shell elements of ANSYS. Solid elements in ANSYS have reinforcement option; but since solid elements do not posses any rotational degrees of freedom; they are not at all suitable for modelling slab response. To continue the use of shell elements; an indirect approach for modelling reinforcement is essential. The technique adopted to cater the reinforcement ratio is described below:

Presence of reinforcement in the slab increases the stiffness of the slab; thus increasing the slab stiffness by proper amount, it is possible to simulate the presence of reinforcement. To increase the stiffness the slab, either thickness or modulus of elasticity of the slab is to be increased. As obtaining a proper modulus of elasticity of the reinforced slab through purely mathematically derived expression is difficult, the former approach has been selected. Basic concept used herein is to compute the moment of inertia of the reinforced slab considering unit width, then using this inertia height of the slab having unit width and consisting of concrete is calculated. Thickness (t_c) calculated in this way represent the slab having thickness (t_e) with given steel ratio. Figures 1(a) and 1(b) show the slab with reinforcement and the corresponding equivalent slab respectively. The equations involved in this process are shown bellow:

$$\bar{y} = \frac{bt_c \frac{t_c}{2} + (n-1)A_s d}{bt_c + (n-1)A_s} \tag{1}$$

$$\bar{I} = \frac{bt_c^3}{12} + bt_c\left(\frac{t_c}{2} - \bar{y}\right)^2 + (n-1)A_s(\bar{y} - d)^2 \tag{2}$$

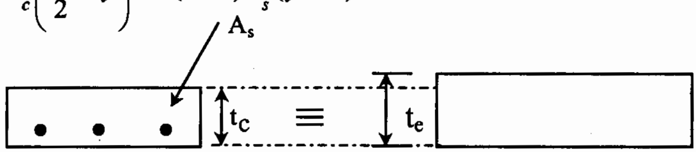


Fig 1(a). Slab with reinforcement *Fig 1 (b). Equivalent slab without reinforcement*

For the equivalent slab in Figure 1(b):

$$\bar{I} = \frac{bt_e^3}{12}$$

$$\frac{bt_e^3}{12} = \frac{bt_c^3}{12} + bt_c\left(\frac{t_c}{2} - \bar{y}\right)^2 + (n-1)A_s(\bar{y} - d)^2$$

$$t_e^3 = t_c^3 + 12t_c\left(\frac{t_c}{2} - \bar{y}\right)^2 + \frac{12(n-1)A_s(\bar{y} - d)^2}{b}$$

$$t_e = \sqrt[3]{t_c^3 + 12t_c\left(\frac{t_c}{2} - \bar{y}\right)^2 + \frac{12(n-1)A_s(\bar{y} - d)^2}{b}} \quad (3)$$

Above equations have been incorporated into Microsoft EXCEL spread sheet and the effective thickness t_e; is obtained from the spread sheet by directly inputting b, t_e, d and A_s. Value of n is selected equal to 9 for analysis purpose.

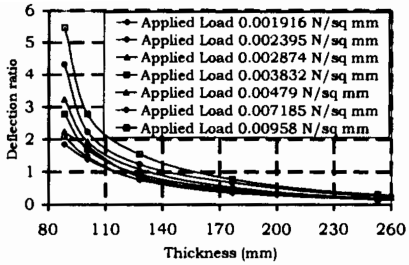
Results of finite element analysis

Effect of slab thickness on deflection

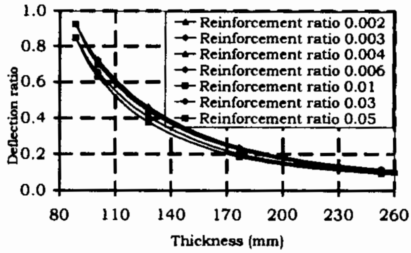
Figures 2(a) and 2(b) show the relation of deflection ratio with slab thickness for case 9 and slab span ratio 0.50 considering load and reinforcement ratios as variables. Deflection ratio for any slab have been computed by dividing deflection of slab centre by the deflection of slab centre due to self weight of 90 mm slab thickness. For the other 44 cases (nine support conditions and five span ratios), similar curves are obtained by Chowdhury (1999). It is observed from the figures that deflection reduces sharply with increasing slab thickness and the deflection can be represented by a function that is inversely proportional to the cube of slab thickness. From these Figures it is found that up to 130-mm thickness, deflection decreases sharply with increasing slab thickness. But from slab thickness 130 mm to 230 mm, deflection does not decrease so much with increasing slab thickness. Beyond 230 mm thickness, deflection remains almost same with increasing slab thickness. Thus for edge supported slabs in ordinary residential building (up to 6000 mm span) a thickness of 130 mm would produce quite satisfactory performance considering deflection.

Effect of applied external uniformly distributed load on slab deflection

Figure 2(a) shows the relation of deflection ratio with slab thickness for case 9 and slab span ratio 0.50 for different applied load. The behaviour is identical for other 44 cases, out of 45 (5x9) cases (Chowdhury S R, 1999).



2(a). Variation of deflection ratio with load



2(b). Variation of deflection ratio with reinforcement ratio

Fig 2. Variation of deflection ratio (deflection/deflection due to self-weight of 90-mm slab thickness) with thickness for case 9 and span ratio 0.50

From this figure it is clear that for constant thickness deflection increases with increasing applied load in the elastic region, which is a very common criteria. Slab deflection is directly proportional to the applied load, which is also reflected from this figure. This figure can be utilised for quick determination of slab centre deflection of edge supported slabs with known applied load and slab thickness.

Effect of reinforcement ratio on slab deflection

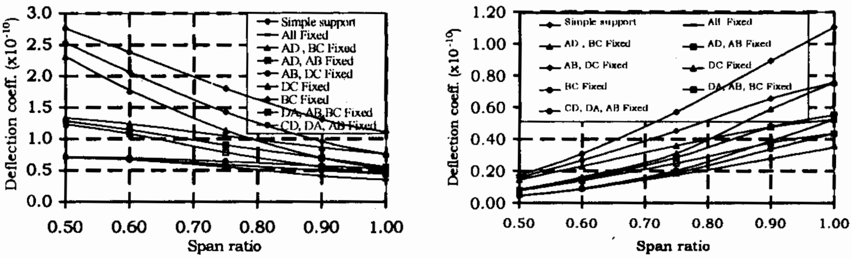
Figure 2(b) shows the relation of deflection ratio with slab thickness for case 9 and slab span ratio 0.50 for different reinforcement ratio. Relation between deflection ratio and thickness for varying reinforcement ratios are same for other 44 case (Chowdhury S R, 1999). From this figure it can be seen that for any constant thickness, deflection ratio decreases with increasing reinforcement ratio. Like Figure 2(a); Figure 2(b) can also be utilised for quick determination of slab centre deflection of edge supported slabs with known reinforcement ratio and slab thickness.

Effect of support condition on slab deflection

Figures 3(a) and 3(b) show the relation of coefficient of deflection of slab centre for short and long directions respectively with slab span ratio for different support conditions. From these figures it can be seen that for any constant span ratio, deflection of slab centre is maximum for simple support (case-1) condition and minimum for all fixed (case-2) condition. At span ratio 1.0, case-6 (DC fixed) and 7 (BC fixed) also case-3 (AD and BC fixed) and case-5 (AB and DC fixed) have same deflection as these slabs functionally represent the same support condition at those span ratios. It can be seen from Figure 3(a) that deflection coefficient of case-3 (AD, BC fixed) is higher than that of case-6 (DC fixed) up to span ratio nearly 0.80 but after that span ratio deflection coefficient of case-3 (AD, BC fixed) less than that of case-6 (DC fixed). The same is observed for case-3 (AD, BC fixed) and case-4 (AD, AB, BC fixed) at span ratio 0.90. This is also true for case-8 (AD, AB, BC fixed) and case-5 (AB, DC fixed) at span ratio 0.90. If support condition is known slab centre deflection at any span ratio can be obtained using these figures. Similar findings are present in Figure 3(b).

Effect of slab span ratio on deflection

Figures 3(a) and 3(b) also show the relation of coefficient of deflection of slab centre in short and long direction respectively with slab span ratio for different support conditions. It can be seen from these Figure 3(a) that for case-1 (slab with simple support), case-7 (BC fixed), case-3 (AD, BC fixed) deflection coefficient decreases sharply with span ratio than other support conditions. Similar findings are present in Figure 3(b).



3(a). Variation in short direction *3(b). Variation in long direction*

Fig 3. Variation of deflection coefficient of slab centre with slab span ratio

Development of coefficient table for slab deflection

Considering the two central strips of a rectangular plate with short span l_a and long span l_b supporting a uniform load w. Equating the centre deflections of the short and long strips gives:

$$\frac{5w_a l_a^4}{384EI} = \frac{5w_b l_b^4}{384EI}$$

$$\frac{w_a}{w_b} = \frac{l_a^4}{l_a^4}$$

and also total load

$$w = w_a + w_b$$

solving:

$$w_a = w\left(\frac{l_b^4}{l_a^4 + l_b^4}\right)$$; thus for a given slab:

$$w_a = w.k \qquad (4)$$

Where:

w_a = share of load w carried in the short direction
w_b = share of load w carried in the long direction

Again midpoint deflection in short direction can be expressed in the following form:

$$\delta = \frac{5w_a l_a^4}{384EI} = \frac{5w_a l_a^4}{384E\dfrac{bt^3}{12}}$$

$$= \left(\frac{5}{384E\dfrac{b}{12}}\right) w.k.\frac{l_a^4}{t^3}$$

$$= C_a \frac{wl_a^4}{t^3} \qquad (5a)$$

In the same way midpoint deflection in long direction is:

$$= C_b \frac{wl_b^4}{t^3} \qquad (5b)$$

Equations 5a and 5b are developed considering simply supported slab only while the philosophy and the final form of the equation is same for all the cases

i.e. $\delta = K_1 \dfrac{w_a l_a^4}{384\,EI}$ where K_1 depends on end restraint condition

$$\delta = C_a \frac{wl_a^4}{t^3}$$

or $\delta = C_b \dfrac{wl_b^4}{t^3}$

Thus using equations 5(a) or 5(b) it is possible to calculate deflection of slab having any support condition and span ratio provided a proper coefficient is available.

Using the verified model for slab; it is possible to obtain the deflection of slab centre for all support cases and span ratios and these can be used to compute the deflection coefficient as follows:

When short direction is used:

$$C_a = \frac{\delta_{FE}}{\frac{wl_a^4}{t^3}} \qquad (6a)$$

When long direction is used:

$$C_b = \frac{\delta_{FE}}{\frac{wl_b^4}{t^3}} \qquad (6b)$$

A complete set of FE analyses has been conducted and the results of the analyses have been transformed using equations 6(a) and 6(b). Table 1 shows the coefficients to be used in short and long direction for different slab span ratio to calculate the immediate deflection of slab centre uniformly distributed load. The same is also shown in Figures 3(a) and 3(b). For using these tables or figures the magnitude of load to be used consists of self-weight of the slab and the applied load.

Verification of developed coefficient method for various realistic conditions

The coefficient table (Table 1) developed for calculating slab centre immediate deflection may be used for span ratio other than span ratio 0.50, 0.60, 0.75, 0.90, 1.00 and for continuous of slab systems. Following sub sections describes the verification of the proposed coefficient tables.

For single slab with different support case

A slab with span 6.096m x 7.62m (20ft x 25ft), i.e., span ratio 0.67 has been selected for the first set of analyses. The slab has been modelled using 10x12 elements. Table 2 shows the insignificant variation of result obtained using coefficient (by interpolation from Table 1 with result obtained from numerical model. Only for case 3 slight variations is observed though it is on safer side. So from above it can be concluded that Table 1 can be used for any slab span ratio.

Continuous slab system

Coefficient table for calculating the deflection of slab centre contains nine cases, which simulate the support conditions either to be fixed or simple support. But for continuous slab, coefficient of Table 1

Table 1 Coefficient of immediate deflection of two-way edge supported slab centre, using short or long direction

Span Ratio $m = l_a / l_b$		Case 1 (10^{-10})	Case 2 (10^{-10})	Case 3 (10^{-10})	Case 4 (10^{-10})	Case 5 (10^{-10})	Case 6 (10^{-10})	Case 7 (10^{-10})	Case 8 (10^{-10})	Case 9 (10^{-10})
1.00	Ca	1.103	0.348	0.524	0.552	0.523	0.755	0.755	0.436	0.436
	Cb	1.103	0.348	0.523	0.552	0.523	0.755	0.755	0.436	0.436
0.90	Ca	1.307	0.407	0.697	0.697	0.569	0.862	0.958	0.552	0.494
	Cb	0.892	0.278	0.476	0.476	0.389	0.589	0.654	0.377	0.337
0.75	Ca	1.8000	0.552	1.132	0.900	0.639	1.045	1.423	0.784	0.589
	Cb	0.570	0.175	0.359	0.285	0.202	0.311	0.451	0.248	0.187
0.60	Ca	2.382	0.667	1.779	1.144	0.699	1.239	2.065	1.080	0.667
	Cb	0.308	0.086	0.230	0.148	0.090	0.160	0.267	0.140	0.086
0.50	Ca	2.762	0.697	2.313	1.283	0.716	1.335	2.534	1.232	0.707
	Cb	0.173	0.044	0.145	0.080	0.045	0.083	0.158	0.077	0.044

Table 2 Comparison of deflection of slab centre using coefficient method and numerical results

Different Cases	Deflection obtained from numerical model	Deflection obtained by using coefficients	Percentage of Variation (based on numerical model)
	(mm)	(mm)	
Case1	7.301	7.422	-1.66
Case2	2.221	2.289	-3.06
Case3	4.307	4.356	-1.14
Case4	3.738	3.820	-2.18
Case5	2.775	2.897	-4.37
Case6	4.435	4.567	-2.98
Case7	5.639	5.669	-0.54
Case8	3.109	3.200	-2.94
Case9	2.493	2.594	-4.05

should be checked to verify whether it could be used for such cases. For this purpose two types of slab with different span ratio and support conditions are discussed herein.

(i) Three-span slab

Figure 4 shows a three-span slab. This slab has been analysed using Finite Element method for various edge conditions (exterior supports either rigid or simple support and span ratios (0.50, 0.67, 0.75,and 1.00). The analyses have been classified into five categories namely cases a to e. In case a all exterior supports are fixed and span ratio varies for all the three slabs at the same time. In case b support condition remains the same whereas the span ratio varies for only the middle slab BCFG. For the two exterior slabs span ratio remains constant (0.50). Case c represents analysis of case-a with exterior support as simple support. Similarly case d represents analysis b with exterior supports as simple support. In all these four cases (a to d) results have been extracted for the middle slab thus cases a and b represent case 2, and thus cases c and d represent case 3 of ACI moment coefficient method respectively. Case e and case c represent the same FE analysis but results have been extracted for the exterior slab which represent case 7 of ACI moment coefficient method. Table 3 summarises all the necessary data for FE model.

(ii) Two-span slab

Figure 5 shows a two-span slab. This slab has been analysed using Finite Element method for various edge conditions (exterior supports either rigid or simple support and span ratios (0.50, 0.67, 0.75,and 1.00). The analyses have been classified into two categories namely cases f and g. In case f all exterior supports are fixed and span ratio varies for slab ABEF where as span ratio remains constant (0.50) for slab BCDE. Case g represents analyses of case f with exterior supports as simple support. In all these cases (f and g), results have been extracted for slab ABEF thus they represent case2 and case 7 of ACI moment coefficient method respectively. Table 4 summarises all the necessary data for the FE model of the two-span slab considered.

Comparison of results

Figures 6 to 12 compares the results obtained from FE analyses with that of the proposed coefficient method of analysis for the studies described in this section. It can be seen from these figures that the proposed method produce quite reasonable results for various cases that may occur in real slab systems and thus is suitable for using in design purpose.

Table 3 Different cases of complete FE model for three-span slab based on fig 4

Case (defined in complete FE model)	Slab	Support case	Span of individual slab (l_xxl_y)			Span ratio	Case (as per coeff. method)
			ABGH	BCFG	CDEF		
Case a	BCFG	All four edges fixed	3.05mx6.10m	3.05mx6.10m	3.05mx6.10m	0.50	Case 2
			3.05mx4.57m	3.05mx4.57m	3.05mx4.57m	0.67	
			3.05mx4.06m	3.05mx4.06m	3.05mx4.06m	0.75	
			3.05mx3.05m	3.05mx3.05m	3.05mx3.05m	1.00	
Case b	BCFG	All four edges fixed	1.52mx3.05m	3.05mx6.10m	1.52mx3.05m	0.50	Case 2
			1.52mx3.05m	3.05mx4.57m	1.52mx3.05m	0.67	
			1.52mx3.05m	3.05mx4.06m	1.52mx3.05m	0.75	
			1.52mx3.05m	3.05mx3.05m	1.52mx3.05m	1.00	
Case c	BCFG	All four edges hinge	3.05mx6.10m	3.05mx6.10m	3.05mx6.10m	0.50	Case 3
			3.05mx4.57m	3.05mx4.57m	3.05mx4.57m	0.67	
			3.05mx4.06m	3.05mx4.06m	3.05mx4.06m	0.75	
			3.05mx3.05m	3.05mx3.05m	3.05mx3.05m	1.00	
Case d	BCFG	All four edges hinge	1.52mx3.05m	3.05mx6.10m	1.52mx3.05m	0.50	Case3
			1.52mx3.05m	3.05mx4.57m	1.52mx3.05m	0.67	
			1.52mx3.05m	3.05mx4.06m	1.52mx3.05m	0.75	
			1.52mx3.05m	3.05mx3.05m	1.52mx3.05m	1.00	
Case e	ABGH or CDEF	All four edges hinge	3.05mx6.10m	3.05mx6.10m	3.05mx6.10m	0.50	Case 7
			3.05mx4.57m	3.05mx4.57m	3.05mx4.57m	0.67	
			3.05mx4.06m	3.05mx4.06m	3.05mx4.06m	0.75	
			3.05mx3.05m	3.05mx3.05m	3.05mx3.05m	1.00	

Comparison with other methods

Figure 13 compares the results obtained from developed coefficient method with that of the different 4 methods [Strip method, Simson's method, Levy's method referred by A.C. Ugral 1981) and a method described by Winter and Nilson (1986), in terms of deflection ratio. Deflection ratio has been defined as the ratio of deflection of the slab for any given support condition calculated using a certain method to the deflection given by strip method for the slab having same geometry but simple support. Figures 14 to 21 compares the result with two different

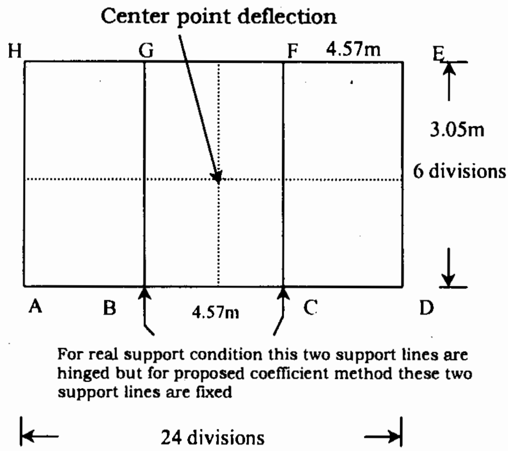


Fig 4. Slab selected for comparing deflection from FE analyses and coefficient method

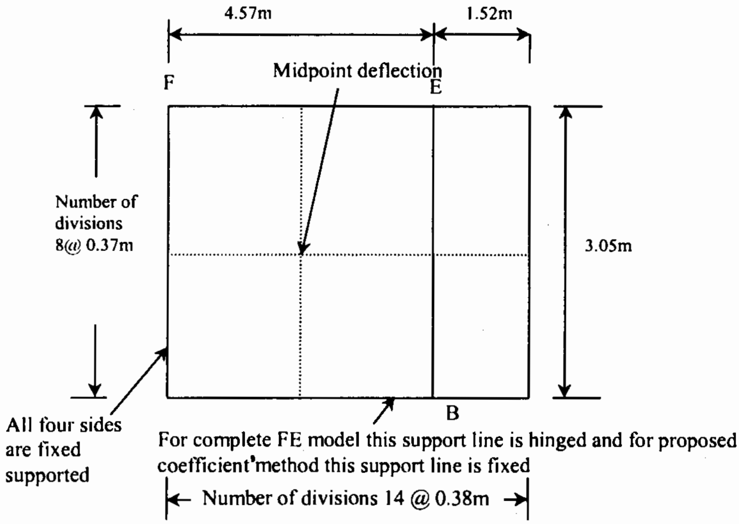


Fig 5. Two-span slab selected for comparing deflection from FE analyses and coefficient method

methods [Strip method and method described by Winter and Nilson), for the remaining eight cases. Although it appears from Figs 13, 14 and 16 that the deflection is constant using Strip method, actually the ratio as stated is constant.

In Figure 13 deflection ratios of slab centre have been obtained by dividing deflection of any slab by the slab centre deflection of that slab computed from strip method. In Figures 14 to 21 deflection ratios of slab centre have been obtained for different cases (cases 2 to 9) and different span ratios, dividing deflection of slab centre obtained from different methods by deflection of slab centre of simple support (case 1) of respective span ratio.

It can be seen from these results that strip method overestimates the deflection for cases 1 and 2. Also for these two cases the available simple equations provide satisfactory results. For cases 3 to 9, presently available methods always underestimate the slab deflection. Thus it can be concluded that the developed method always provides better results and is simple to use.

Table 4 Different cases of Complete FE model for two-span slab based on fig 5

Case (defined in complete FE model)	Concerned Slab	Support case	Span of individual slab (short x long span)		Span ratio	Case (as per coeff. method)
			ABEF	BCDE		
Case f	ABEF	All four edges fixed	3.05mx6.10m	1.52mx3.05m	0.50	Case 2
			3.05mx4.57m	1.52mx3.05m	0.67	
			3.05mx4.06m	1.52mx3.05m	0.75	
			3.05mx3.05m	1.52mx3.05m	1.00	
Case g	ABEF	All four edges hinge	3.05mx6.10m	1.52mx3.05m	0.50	Case 7
			3.05mx6.10m	1.52mx3.05m	0.67	
			3.05mx4.06m	1.52mx3.05m	0.75	
			3.05mx3.05m	1.52mx3.05m	1.00	

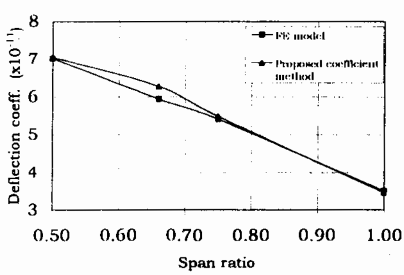


Fig 6. Comparison of deflection between complete FE model and proposed coefficient method for case a of Fig 4

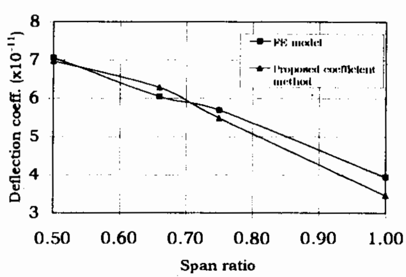


Fig 7. Comparison of deflection between complete FE model and proposed coefficient method for case b of Fig 4

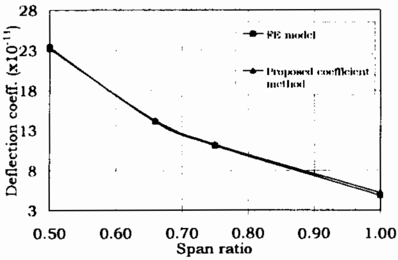


Fig 8. Comparison of deflection between complete FE model and proposed coefficient method for case c of Fig 4

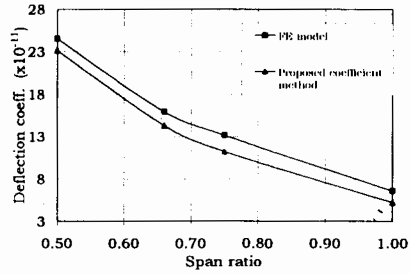


Fig 9. Comparison of deflection between complete FE model and proposed coefficient method for case d of Fig 4

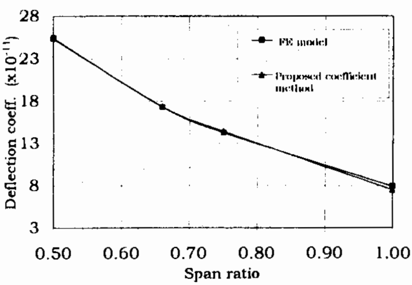


Fig 10. Comparison of deflection between complete FE model and proposed coefficient method for case e of Fig 4

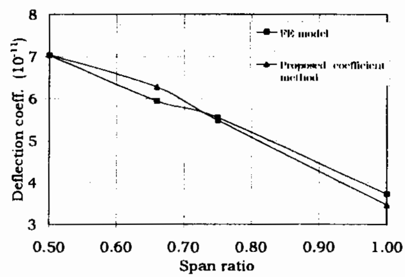


Fig 11. Comparison of deflection between complete FE model and proposed coefficient method for case f of Fig 5

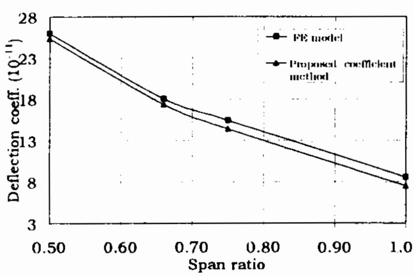


Fig 12. Comparison of deflection between complete FE model and proposed coefficient method for case g of Fig 5

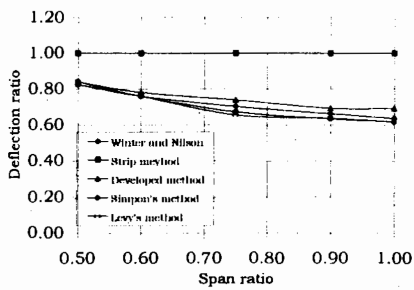


Fig 13. Effect of span ratio on deflection ratio (deflection/deflection for strip method with simple support condition) in various methods for case 1

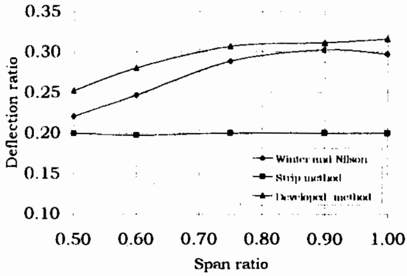


Fig 14. Effect of span ratio on deflection ratio (deflection/deflection for strip method with simple support condition) in various methods for case 2

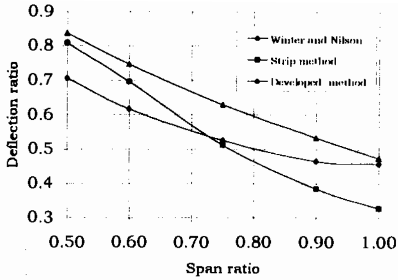


Fig 15. Effect of span ratio on deflection ratio (deflection/deflection for strip method with simple support condition) in various methods for case 3

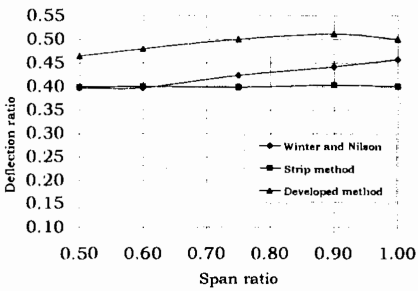


Fig 16. Effect of span ratio on deflection ratio (deflection/deflection for strip method with simple support condition) for various methods for case 4

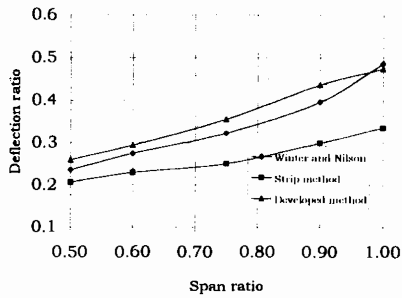


Fig 17. Effect of span ratio on deflection ratio (deflection/deflection for strip method with simple support condition) in various methods for case 5

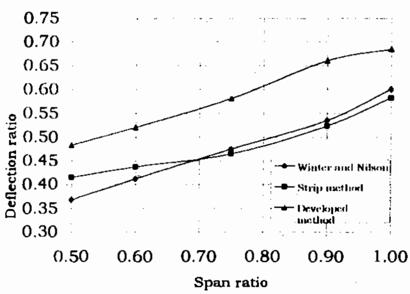


Fig 18. Effect of span ratio on deflection ratio (deflection/deflection for strip method with simple support condition) in various methods for case 6

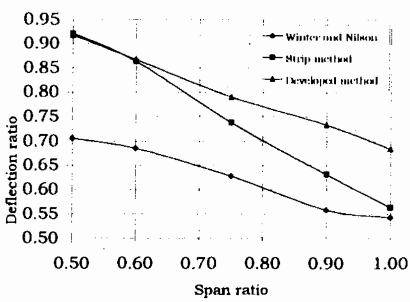


Fig 19. Effect of span ratio on deflection ratio (deflection/deflection for strip method with simple support condition) in various methods for case 7

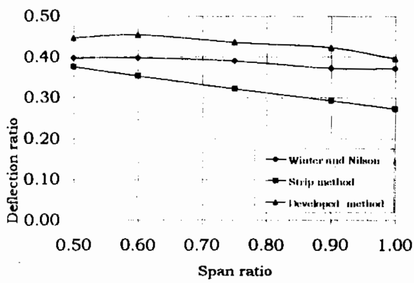


Fig 20.Effect of span ratio on deflection ratio (deflection/deflection for strip method with simple support condition) in various methods for case 8

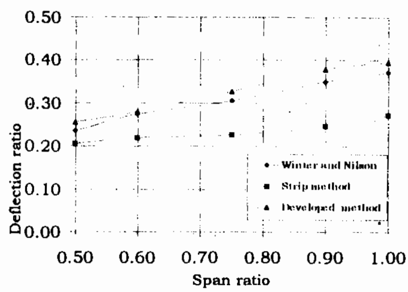


Fig 21. Effect of span ratio on deflection ratio (deflection/deflection for strip method with simple support condition) in various methods for case 9

CONCLUSIONS

The finite element model described in the companion paper has been employed to study the deflection behaviour of edge supported slabs. Methods are described for indirect inclusion of the reinforcement into the FE model. Equations are derived for converting the FE moments and deflections into deflection coefficients. Parametric studies have been conducted for understanding slab response; results of which have been converted in to deflection coefficients. A comprehensive table has been formulated for using in conjunction with the ACI moment coefficient tables. To verify this table further FE investigations have been conducted with continuous slab system having variable span ratios. It has been observed from the comparison of results that quite satisfactory results are obtained using the coefficient table and thus concluded that it can be incorporated in to future design practice. Finally results have been compared with available simple methods which demonstrated the accuracy of the proposed method.

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