論文題目："Dynamic response evaluation of truss spar structure due to wave force interaction"

著者：Min-su, Park, Kenji Kawano
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◆討議［Hiroshi Katsuchi（Yokohama National University）］

Please explain more clearly what kind of cases can neglect the interaction effect. For example, is it possible to explain by a non-dimensional number of the spar distance and diameter?

◆回答：The interaction effect is closely related to the diameter of spars and the distance among spars. When the rate of *D/L*, which *D* is the diameter of a spar and *L* is the wave length, is less than 0.2 for a single spar, the interaction effect can be neglected. But, it can not clearly be prescribed for other cases. I think it is important to examine about the wave force for changing the diameter and the distance when the spars are more than two. Fig 1 shows the relation between the dimensionless wave force and the distance among four spars. The diameter of spars is 10m and the solid line presents the case of Morison wave force. The difference between the interaction wave force and Morison wave force is gradually decreased as the distance is increased. If the distance is more than 120m, the interaction effect can be neglected in this case. Fig 2 shows the relation between the dimensionless wave force and the diameter of spars for four spars. The distance among spars is 80m and the abscissa denotes the wave number. The difference between the interaction wave force and Morison wave force is also gradually decreased as the diameter is decreased. If the diameter is less than 5m, it is suggested the interaction effect can be neglected because the interaction wave force is generally similar to the Morison wave force.

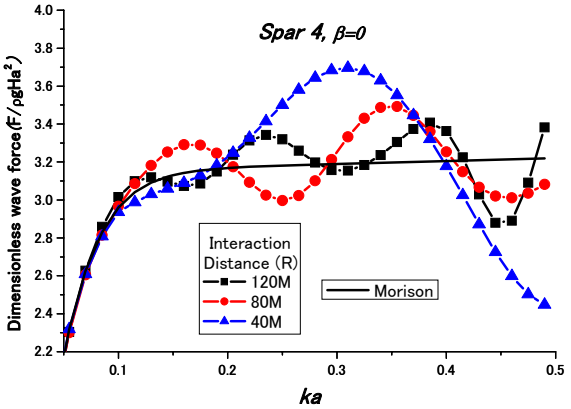

Fig 1. Wave force according to the distance.

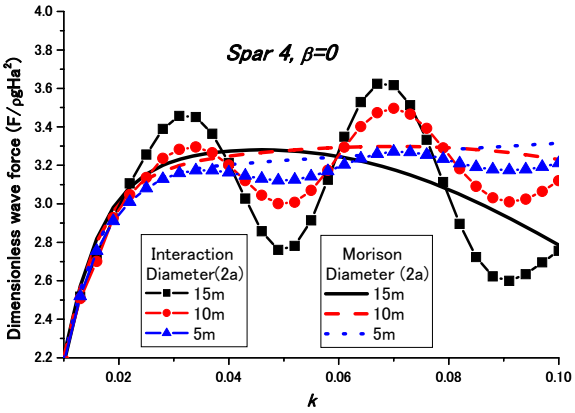

Fig 2. Wave force according to the diameter.

論文題目："Flow-force relationship for two staggered circular cylinders with low angle of incidence"

著者：Haeyoung Kim, Wen Liu, Tetsuya Kitagawa and Elena Dragomirescu
掲載：Vol.54A, pp.411-419, 2008 年 3 月

◆討議［Fumiaki Nagao（Tokushima University）］

Which is larger C_D value in a = 5 or 15 degree case? In addition, please explain more clearly the bistable flow.

◆回答：For the first question, as shown in Fig. 7(b) in our paper, the value of the mean C_D of the downstream cylinder increased as the incidence angle increased: the value of the mean C_D of the downstream cylinder at the incidence angle of 15 deg was lager than that at 5 deg. In contrast, that of the upstream cylinder decreased gradually as the incidence angle increased. Fig. 7(b) also shows that the mean C_D values of our simulation are in good agreement with the experimental results in *Re* = 32,000 obtained by Summner et al. (2005). For the second question, the bistable flow represents the alternate appearance of two flow-phases when the incidence angle is of 10 deg, in which the value of the mean C_L of the downstream cylinder has time dependency. In the experimental investigation by Sakamoto et al. (2004), the mode-1 of the bistable flow represented the flow pattern for the mean C_L becoming strong in negative, and the mode-2 was for the weak C_L-magnitude. The same terminology for these patterns was used in our study.

◆討議［Hiroshi Katsuchi（Yokohama National University）］

Regarding the bistable flow, which is more stable, model 1 or model 2? In addition, do those two models appear alternately or randomly?

◆回答：Because there are only two modes, each mode appears alternatively. A difference between our simulation result and the experimental one by Sakamoto et al. (2004) is the time duration of each mode. The time durations of the two modes were not found to be unity in our simulation, while the experimental data by Sakamoto et al. indicated that each modes had specific time-durations. In our simulation, because the time duration of the mode-2 was longer than that of the mode-1 mostly, the mode-2 can be more stable than the mode-1. However, in the experimental result by Sakamoto et al., the period of duration in the mode-1 was longer than that in the mode-2. Although the reason for this inconsistency was not identified, a possible cause is the difference in the cylinder length, i.e., the cylinder span-wise length of the computational space in our simulation was not long enough for the three-dimensional flow to have developed. Trials with computational spaces having longer span-wise length need to be carried out.

論文題目：“Effects of approximation of self-excited forces by rational function on wind-induced response of a long-span bridge”

著者：Nguyen Danh Thang, Hiroshi Katsuchi, Hitoshi Yamada and Eiichi Sasaki
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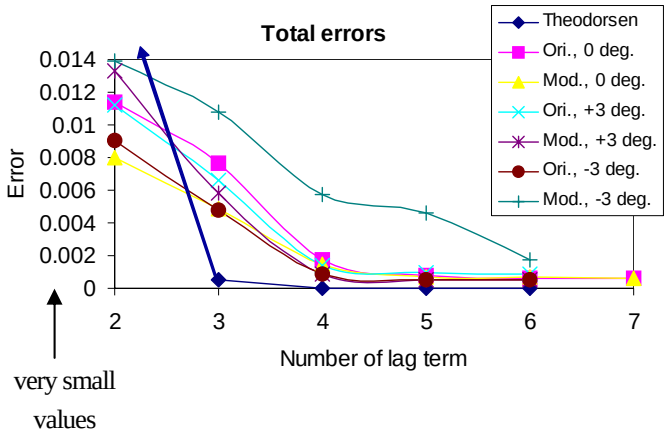
◆討議［Fumiaki Nagao（Tokushima University）］

Why do you have similar responses for largely different approximation results of flutter derivatives?

◆回答：Although the errors of flutter derivatives between approximation data and tabular data look have largely different values, all total errors are very small (as shown in below figure). For all cases, the maximum values of approximation error are approximate 0.0504 for Theodorsen theory (2 lag terms) and 0.0139 for Akashi Kaikyo Bridge (modified section, α_a = -3degree, 2 lag terms). Maybe these errors are too small and not enough to cause the big difference of structure’s response at analyzed cases. That’s reason why the obtained results of structure’s response are almost the same in this study.



◆討議［Takuya Murakami（JFE R&D Corporation）］

Is it possible to apply the rational function approximation method for any other cross sections? There may be an inadequate approximation for a complex cross section unlike an airfoil. What do you think of this?

◆回答：Of course this method can be applied for any other cross section. In my opinion, if we want to obtain the more accurate results for very complex section, we have to use more number of lag terms to approximate the flutter derivatives. The more lag terms were used, the smaller error was obtained (as show in my study). However, in most of case, 4 lag terms is enough to obtain a reasonable result for both flutter derivatives and structure’s response.

論文題目：“Aerodynamic stability of Suramadu cable stayed bridge”

著者：Sukamta, Fumiaki Nagao, Minoru Noda and Kazuyuki Muneta
掲載：Vol.54A，pp.429-435，2008 年 3 月

◆討議［Hiroshi Katsuchi（Yokohama National University）］

You tried many cases of fairing angles. How did you select the fairing angle?

◆回答：The angle formed by the vertical surface of the box girder and the line connecting from a lower leading edge of the end stringer to the bottom corner of the box girder was 44 degrees as shown in Figure 2. Therefore, one of the angles of elevation of lower surface was chosen as 44 degrees. Some variations of the fairing angle were selected based on this value.

論文題目："都市部に架かる狭幅員箱桁橋梁のギャロッピング評価"

著者：御嶽譲・木村真二・山本泰幹・山田均・村上琢哉当麻庄司
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◆討議［米田昌弘（近畿大学）］

乱流実験で橋桁の耐風性を評価する際には，気流の相似度合いが重要と考えられるが，乱れスケールの相似度合いはどうでしょうか？

◆回答：論文中にも記載させて頂いておりますが，今回は乱流格子を用いておりますので，乱れスケールは架設地点よりもかなり小さく，乱れスケールの相似はされておりません．今回は Irwin らが提案している変動風速スペクトルの形状を部分的に相似させる方法を採用しております．剥離せん断層に影響を及ぼすと言われている慣性小領域が一致するように，使用設備の乱れスケール，乱れ強度を設定しておりますので，乱れ強さ，乱れスケールだけを見ても相似されておりません．この方法は，乱れ強さだけを合わせるよりも矩形断面柱における背圧係数の一致が良いことも確認されていますので，有効性は確認されていると判断して適用させて頂いております．