Dear reviewer:

We’d like to sincerely thank you for your careful review. Their valuable suggestions are helpful for improving our paper. We have tried our best to make all the changes suggested by reviewer. Here is a summary of these changes, which are listed one by one as follows. In addition, we have supplied some details in the paper to make it more readable. We sincerely hope that the revised version can satisfy the suggestions and requests.

Please find below our response to the reviews.

With best regards,

Sincerely yours

Benniu Zhang

Reviewer 1:

1. In introduction section, the authors should give more details, e.g. advantages and disadvantages, of previous studies to highlight the contribution of the present study.

Response: Thanks for the reviewer’s valuable suggestion. The authors have described the advantages and disadvantages of previous studies in introduction. (Lines 89 to 91 and lines 100 to 105 of introduction section.)

2. We have known length will have a significant effect on the stress detection of prestressed steel strands. Why the authors studied this topic again? The authors need to highlight the objective of the study.

Response: Thanks for the reviewer’s valuable suggestion. Different from other researches, this paper studies the stress measurement of steel strands based on the LC electromagnetic oscillation method. The detection methods and ideas are relatively novel. In this method, only the two ends of the strands that are simulated as inductors are connected to the LC oscillating circuit, and the oscillating frequency of the circuit is measured by a frequency meter to calculate the stress of steel strand. In the previous studies based on the LC electromagnetic oscillation method (Ref. [21-22]), the force-frequency trends of the 1.2m and 10m steel strands are completely opposite. The reason for this phenomenon may be that the length of steel strands are different
and the inductance characteristics are different. Therefore, this paper carries out related theoretical and experimental research on steel strands of different lengths. A supplementary explanation has been added in section 1.3.

3. In Figs. 10-12, the results for the 1.2m strand present an opposite trend with the results for the 5, 10 and 15 strands. The authors may give the explanation (mechanism).

Response: Thanks for the reviewer’s suggestion. Should Figs. 10-12 be Figs. 9-11? Because the 1.2m steel strands mainly exhibits the inductance characteristics of segment wire, while the 5m, 10m and 15m steel strands mainly exhibit the inductance characteristics of the spiral coil. When the strand shows the inductance characteristic of segment wire, the stress increases, the inductance increases, and the frequency decreases. When the strand shows the inductance characteristic of the conductor, the stress increases, the inductance decreases, and the frequency increases. Therefore, the data analysis of the tensile test of 1.2 m steel strand shows that the frequency decreases with the increase of stress; while the test analysis of 5 m, 10 m and 15 m steel strands shows that the frequency increases with the increase of stress. Additional explanations have been made in section 3.3. (Lines 375 to Line 377.)

4. Why the authors choose 1.2, 5, 10 and 15 m strands for study? The reviewer does not believe the four cases are enough to obtain an empirical model. 2.013 and 2.019m are questionable. More cases are recommended to verify the conclusion.

Response: Thanks for the reviewer’s suggestion. It may be that the authors do not describe clearly, the critical length of steel strand is (2.013, 2.199). More steel strands of different lengths should be selected as test samples, but due to the limitation of test conditions, 2 m, 3 m or 4 m strands can not be fixed on test equipment. In addition, 1 m, 5 m, 10 m and 15 m steel strands should be selected as test samples, but the limitation of the universal test machine, only 1.2 m that fits test equipment can be selected. After the author's analysis and calculation, the length and number of test samples will not affect the final results.

5. The reviewer is confused with the result(1.2, -0.000120). Both frequency and stress are positive, how to get the negative value? The authors should explain.
Response: This suggestion is valuable. The meaning of \( f/\sigma \) is slope \( k_{(f/\sigma)} \), which is caused by the authors’ carelessness. Figure 13, Equations (31), (32) and contents of section 4.1 have been all modified in the manuscript.

6. Please shorten the conclusion section.

Response: Thanks for the reviewer’s suggestion. We have shortened the conclusion section in the manuscript.

7. Line 344 “the median filter...” The authors may explain why they use median values in analysis.

Response: In order to improve the measurement accuracy of the oscillation frequency, the output data detected by the frequency meter are the average value of multiple measurements within the set time, that is, the median frequency used for data analysis in the manuscript. This method has two advantages in data processing: a) Reducing the workload of data processing; and b) Improving the accuracy of frequency data.

8. Should the last sentence “Therefore, this paper ... LC electromagnetic vibration method for stress detection of steel strands.” in the introduction be “Therefore, this paper ... LC electromagnetic oscillation method for stress detection of steel strands.” (1.3. Electromagnetic Oscillation Method). Please confirm it.

Response: Thanks for the reviewer’s suggestion. The expression of “LC electromagnetic vibration method” should be “LC electromagnetic oscillation method”, The authors have revised it in this manuscript.

9. The application of the electromagnetic oscillation method to stress detection of prestressed steel strand is potentially an important demonstration of the technology. It would be interesting to know whether this method is suitable for stress detection of steel strands in concrete structures?

Response: The reviewer's suggestion is valuable. In the next stage, we will try to
apply this method to the stress detection of steel strands in concrete structures.

10. There are typos and grammatical errors. For example, "the experimental system is composed as shown in Figure 6." can be 'the experimental system is presented in Figure 6". "3.2.2 The experimental devices and procedure of short steel strand" should be "3.2.2 Experimental devices and procedure of short steel strand". A careful proofreading is recommended.

Response: Thank the reviewer very much for your suggestion. Now, we have improved the organization of the manuscript and made some revisions. We’ve tried our best to solve the grammar and typos problem.

Thanks again for your comments and suggestions.