Overall comments

The paper's objectives are well defined and the sections clearly outline the authors goal. However, the text is not easy to follow to due long sentences. Also, the work performed to implement the code in OpenFOAM is a major feat which needs to be praised and recognised.

My recommendation is to publish the paper once the following comments have been addressed.

Technical comments

- L31: the list of possible ViV is interesting, it will be better to illustrate the impact thanks to, ideally, a picture of it happening or at least a sketch
- Fig3, why the cylinder not centred in the domain ? Was there any sensitivity study performed regarding the domain size and /or cylinder position ?
- L170: precise the FSI is performed using modal approximation (similar to OpenFAST). At first, it could be understood that a FE approach is done.
- L174: illustrate the "stepped tower" used in your calculation
- Eq10 and Eq15 use capitalised psi (Ψ), while Eq11,12,13,14 use the non-capitalised version (ψ)
- Eq11 and Eq12: consistency in writing the derivative. Either $v'' and\ v'$ or $\dot{v}\ and\ \ddot{v}$; here both are used
- L195 / Eq18, the phrasing "equivalent moment of inertia and mass" can be misleading as it looks like an average value, since it is the total sum divided by the length ?
  Moreover, saying "These equations are divided by the total length of the tower to ensure that both i_eq and m_eq have the right units of the moment of inertia and mass per unit length" feels like the i_eq and m_eq are build to satisfy your needs rather than the opposite. If it is not the case, could you please elaborate ?
- L218: the mean error is calculated with respect to the Richardson extrapolation or previous results from Virée et al. ?
- L223: the separation point is provided in degree, I suppose it is when the cross section of the cylinder is plotted on an r-theta coordinate system ? Here everything is provided in cartesian or in x/c coordinate. Could you translate your results from degree to x/c system, so that it fits the plot in Fig4
- L269: The methodology to derive the natural frequency is detailed in section 3.1 and the numerical result is 0.48Hz. Using the methodology described in "aerodynamics of wind turbine" from Martin Hansen. Do you end up to that same frequency ?
- Table 2: Understood that the code needs a 3D structure, however a single cell of 1m seems prone to introduce edge effect ? Have you checked that ?
  Why not introducing either a small cell size (e.g. y+ dimension) ? Or using the same refinement in the z-direction than for x and y but on a smaller length (to limit the computational cost)
- Section 4.2.1: It seems that GCS was performed only for Re = 3.6e6 ? I fear that for very high Re (e.g close to 18e6) the mesh may not be sufficient, have you performed analysis to verify that ? (even if it is not properly described in the paper)

- Fig9: very interesting plots! For consistency can you use the same “time zones” in your zoomed in snippets ?
- L306: I was expecting to see vortex shedding behind a cylinder when reviewing the paper. When discussing about the “beating pattern” it would be interesting to see it by plotting the vorticity is Q-criteria. With a cylinder having Von Karman streets should be easy to see and correlates to the shedding frequency.
- Fig11: it is a very important figure which introduce the core of the result. Can you add a zoomed in version next to it where you focus between 0 < U/U_st < 2 and disregard the viscous component
- L341, “vice versa” leads to confusion I don’t think it is necessary here
- Fig12: I disagree with the interpretation of these plots. The energy transfer is analogous to the system's work and rather than the average the integral should be calculated. When applying the “work-energy principle” $W = \Delta E_k = \frac{1}{2}mv_2^2 - \frac{1}{2}mv_1^2$ where v_2 and v_1 are the cylinder speed after and before the work is done, you realise that W is non zero. The reason being the cylinder does not finishes at rest.
  Therefore, I would say, that the same conclusions drawn for Fig13 and Fig14 apply here. The instantaneous values seems the most relevant in the case of the building up to the ViV state. Looking at Fig12b and 12c, I would say that the kinematic force contributes more than the vortex induced force.
  It is even more obvious in Fig13 and Fig14, where the red shaded area is driven by the green shaded area
- The conclusion is well written and summarise nicely the work performed and outcomes. It is mentioned that tower designer should take care of cylinder size, taper, taper ratio. Will an second part of the current paper address in more details the relationships between those design parameters and the lock-in phenomena ?