

11 Exhaust system



The choice of a suitable exhaust system depends on two factors, firstly that of originality in that it shall look period or authentic, subject to today's noise restrictions, and secondly out and out power with no recourse to cosmetic appearances. We want the same

restrictions that apply to helicopters, jumbojets and F1 car racing! When first produced the original systems were designed to silence the exhaust note, as little or no expertise was available on tuned pipes. The chapter graphic shows a typical stub exhaust for a Villiers scrambler, it was loud, and it was like a vacuum cleaner on the over-run. On the trials and roadster, original header systems were nothing more than a straight pipe, with a proprietary silencer stuck on the end. This set up did little for the power output of the engine, but in those days it did not matter as other runners were also dogged by the same lack of expertise.

The Scrambles or Motocross scene saw the biggest change, for originally systems were little more than a short length of pipe, cut off at a specific length to give the right power characteristics. At one time a works machine was seen to be using nothing more than a 4 inch deflector plate sticking out from the finned exhaust nut, more in an effort to stop paint being burnt off the frame. With no noise regulations in operation in the sixties these systems were painful to the ear, with noise levels reaching 115 to 120 Db. As time progressed the pipes became longer and flatter, resulting in the under crankcase squashed megaphones, which were prone to suck in paddock floor debris on the negative pressure waves. To counter this problem a switch to the long tapering expansion chamber was made, but as yet unsilenced. As time progressed and the world became more environmentally friendly, and the introduction of mandatory silencers was made. This had little or no effect on power outputs as two-stroke pipe technology had advanced beyond the wildest dreams of the average rider. Silencing today is a legal requirement (110 Db in 1990 and 105 Db in 1993, a 50% reduction in a very short period of time, now in 2012 still at 105 with trends to 103), and often achieved by the use of an absorption muffler, made from a thick wall alloy tube of sufficient volume, loosely packed with glass wool, around a central perforated tube. An exhaust could be supplied by any one of the many fabricators that specialise in computer designed, exhaust pipe manufacture. The formulae presented in this publication have been verified by the authors with qualified success. We do not pretend that it is easy, or simple, just beware of any offer that promises easily achieved success whatever your engine.

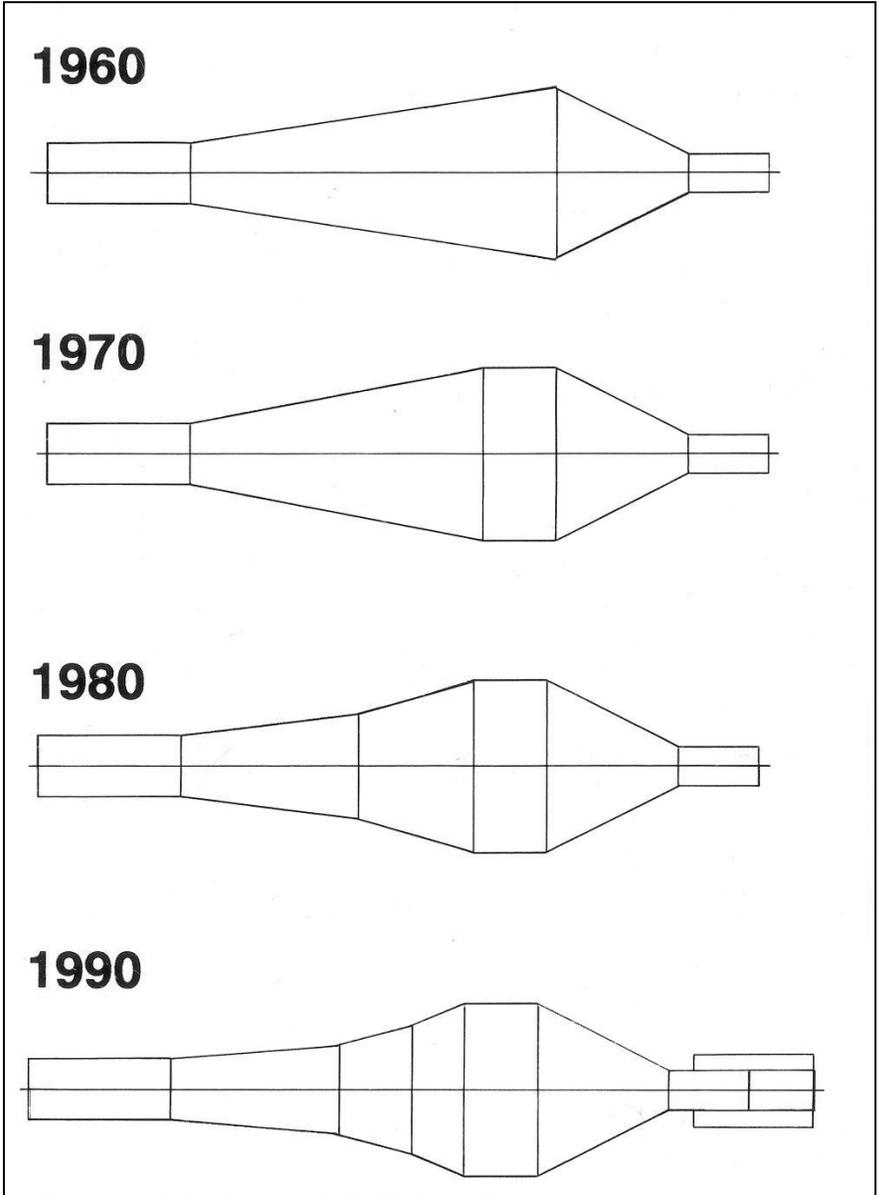


Figure 63 Exhaust pipe evolution

The evolution of the exhaust pipe has been charted on the previous page, and for simplicity, each shape has been loosely associated with the decade in which it was popular. The 1960 shape is a straight pipe header, no belly section, and a stinger which is too short and too fat. In 1970 the straight header pipe is retained, but we have a belly section giving better