IN THE HIGH COURT OF THE REPUBLIC OF SINGAPORE

[1997] SGHC 337

Suit 1647/1995

Between

Singapore Precision Stampings Pte Ltd

… Plaintiff

And

Ranoda Electronics Pte Ltd

… Defendant

GROUNDS OF DECISION

Version No 1: 29 Oct 2026 (23:45 hrs)

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Singapore Precision Stampings Pte Ltd v Ranoda Electronics Pte Ltd

[1997] SGHC 337

Suit 1647/1995
Amarjeet Singh JC
12 December 1997

1 **Judgment:**

2 **GROUNDS OF DECISION**

3 **Parties**

4 1. The Plaintiffs are manufacturers and suppliers of electrical and computer component parts.

5 2. The Defendants are in the business of manufacturing and assembling electrical *connectors* and engineering plastic components for their computer industry.

6 3. The Plaintiffs were at the relevant time, a subsidiary of the then Uraco Precision Engineering Pte Ltd ('Uraco Precision'). The Defendants were at that time, a subsidiary of Uraco Technologies Pte Ltd ('Uraco Technology'). Both subsidiaries were related by common shareholders then and had a good business relationship since 1993. Sometime in or about 1994, the two subsidiaries ceased

to have common shareholders. The Plaintiffs' parent company was publicly listed on the Stock Exchange of Singapore in 1995.

7 **Claim and Counterclaim**

8 4. The Plaintiffs' action herein was to recover from the Defendants the price of $378,551.99cts in respect of certain goods used in the computer industry which the Plaintiffs had sold and delivered to the Defendants between 29 December 1993 to 28 July 1994. The goods were *Bandolein Pins, SMP contacts* and receptacle terminals, known as *Vertical Socket Terminals* (*"VSTs*") from which connectors *('connectors')* conducting electrical current are produced. The Plaintiffs produced *VSTs* in a precision stamping metal process whereby a strip of metal in a roll is stamped between a mould below and a die above. It was an undisputed fact that the Plaintiffs had to produce *VSTs* with a contact gap of 0.40mm with +/- 0.5 mm error according to drawings supplied by the Defendants so that the upper threshold of the contact gap was 0.45mm and the lower 0.35mm to be acceptable to the Defendants. After stamping, the *VSTs* were wound onto cardboard reels and packed for delivery to the Defendants. Each reel of *VSTs* could be cut into about 45,000 pieces of *VSTs*. The *VSTs* would be transformed after cutting by the Defendants into a different final product - a *connector* with 28 pins. The *connector* was assembled by the Defendants by inserting a number of VSTs into a plastic housing. The process was described by Teo Sze Cheng (DW1) the Defendants' Senior Quality Engineer as follows:

9 "The plastic housing has required number of holes in it, 28 for this product. VST terminals cut to required number 4 sets of 7 pieces required for one connector. 2 parallel rows of holes. 1st set of VST will go into first hole

occupying alternate holes, 2nd set goes to 2nd hole occupying the alternate holes, 3rd set goes into 1st hold of 2nd row occupying alternate holes, 4th set goes into 2nd hole of 2nd row occupying alternate holes. The VST gap is pushed in and locked in the hole of the plastic house. This completed piece is known as receptical. The VSTs undergo plating process before being slotted in."

10 The Defendants had contracted to deliver the *connectors* to their customer Seagate Technologies for incorporation into computer boards. Seagate's documents refer to the *connectors* as '*J2 receptacles'*.

11 4.1 DW1's further evidence by Affidavit was that a header pin 0.495mm supplied by a third party customer to Seagate would mate with the *connector* on Seagate's computer board after Seagate had assembled the same to form an electrical circuit.

12 5. The Plaintiffs had obtained summary judgment for $318,000/- in respect of the *Bandolein Pins* and *SMP contacts*. That left a balance of their claim of about $58,680.06cts excluding GST, concerning the *VSTs* to be litigated together with the Defendants' counterclaim for the supply to them by the Plaintiffs of *VSTs* which did not meet the contractual specifications resulting in a breach of contract and for all loss and damages suffered consequently by the Defendants, which I shall set out briefly very shortly. At the trial before me, the Plaintiffs eventually claimed only a balance of $56,760/- being the price of the *VSTs* after agreeing to deduct without admission of any manufacturing fault on their part, $1,900/- or half the amount in respect of 12 out of 24 reels of *VSTs* the subject matter of Invoice 0403 dated 17.2.95 which had been rejected by the Defendants. The comprehensive set of invoices containing deliveries of *VSTs* for which the Plaintiffs were not paid is as follows:

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13 Plaintiffs' Invoice No. Date of VST Value

14 Bundle Invoice Quantity $

15 (PB) '000 pcs

16 16 0386 07.02.95 500 2,000.00

17 18 0389 10.02.95 890 3,560.00

18 219 Free of charge (reworked)

19 20 0395 16.02.95 520 2,080.00

20 **22 0403 17.02.95 960 3,840.00**

21 24 0407 20.02.95 360 1,440.00

22 26 0413 23.02.95 1,480 5,920.00

23 32 0427 28.02.95 1,600 6,400.00

24 38 0436 04.03.95 480 1,920.00

25 42 0448 09.03.95 920 3,680.00

26 44 0452 13.03.95 800 3,200.00

27 50 0460 20.03.95 2,880 11,520.00

28 52 0470 23.03.95 1,360 5,440.00

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29 58 0477 27.03.95 960 3,840.00

30 62 0484 29.03.95 960 3,840.00

31 ----------

32 14,889 $58,680.00 (excludes GST)

33 ----------

34 Total: $60,440.40 (with 3% GST)

35 I may add that the Defendants had orginally ordered altogether 20,000,000 pieces of *VSTs* (S50630-200-00) under a purchase order on 1.12.94 for a total sum of $80,000/- plus tax. Some *VSTs* were delivered to the Defendants in December 1993 and January 1994 and these had been paid for by the Plaintiffs.

36 6. The Defendants denied owing the balance due in the said sum of $56,760/- and instead by way of counterclaim sought to claim:

37 (a) damages for loss of profits to be assessed;

38 (b) the sum of $2,071,985/- made up of loss of profit consisting of:

39 (i) $795,000/- based on 30% margin of their sale price of $0.53cts. per *connector* for 5,000,000 pieces arising from Plaintiffs' breach of contract in supplying defective *VSTs* concerning the delivery in Invoice 0403 from which connectors had been manufacturered and supplied to Seagate who had rejected them because they only produced intermittent electrical contact as their contact

gaps were ‘out of specification’ that had been agreed and Seagate further cancelling all the staggered orders to come.

40 (ii) $1,276,985,000/- (US$899,285.40cts) based on margins of profit of between 12% to 50% of their sale price as set out in the counterclaim arising from a cancellation by Seagate of all existing orders placed with the Defendants in respect of *other products.*

41 (c) ***Further*** and/or ***alternatively***, the expenditure of $209,000/- incurred and wasted by the Defendants for the manufacture of the above *connectors* and cancelled orders namely:

42 (i) cost of 87,000 pieces of assembled *connectors* which had to be scrapped - $49,000/-.

43 (ii) cost of the remainder of new materials which were yet to be incorporated into *connectors* - $25,000/-.

44 (iii) cost of the machines and equipment required of the manufacture of the *VST* terminals - $135,000/-. (iv) interest.

45 The Defendants’ counterclaim occupied almost all the time of the trial.

46 **Orders**

47 At the conclusion of the trial, the proved probabilities of the Plaintiffs’ claim being in their favour and that of the counterclaim being against the Defendants, I made the following orders:

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48 **" (1) Judgment for the Plaintiffs in the sum of $56,760/- with costs to be taxed or agreed. Interest on judgment amount at 6% from date of issue of Writ to date of judgment.**

49 **(2) Defendants' counterclaim is dismissed with costs to be taxed or agreed. "**

50 7. The Defendants being dissatisfied with the above decision, they now appeal.

51 **Issues**

52 8. There were two main issues in the action:

53 (1) Whether the Plaintiffs supplied VSTs to the Defendants which were 'out of specification' and/hence defective resulting consequently in defective *connectors* being manufactured by the Defendants and that the cause and effect of the defective *connectors* made was attributable to the Plaintiffs and not the Defendants and further

54 (2) Whether as a result of Seagate cancelling or rejecting all the Defendants' orders for their:

55 (a) *connectors* and consequently

56 (b) other products,

57 the Plaintiffs are liable for the same.

58 **Evaluation and Findings**

59 9. As has been seen, between 7.2.95 and 29.3.95, the Plaintiffs had delivered 14,889,000 pieces of *VSTs* to the Defendants. There had also been some deliveries of *VSTs* before 7.2.95 for which the Plaintiffs had already been paid.

60 9.1 The Defendants' entire defence and counterclaim was very substantially built around the delivery of 17.2.96 concerning the 24 reels of about 960,000 pieces of *VSTs.*

61 9.2 It was the Defendants' case that after the delivery to them of the *VSTs* on 17.2.96 the Defendants caused routine *incoming* checks as was their practice. Samples of the *VSTs* examined showed that out of the 24 reels delivered 12 reels of *VSTs* did not meet the contractual specifications as the *VSTs* were out of specifications and those 12 reels were rejected by the Defendants as is set out in their *Non-Conformance and Corrective Action Report* dated 18.2.95 (*"18 February CAR"*) a copy of which was sent to the Defendants with a remark against the proforma print:

62 **"Corrective Action:**

63 **Please advise corrective action."**

64 In respect of the 12 rejected reels, samples taken by the Defendants from the initial five to ten feet of each reel showed a contact gap in the *VSTs* of between 0.484mm to 0.501mm which was beyond the upper threshold limit of 0.45mm. Altogether 1,250 pieces of VST samples had been cut and examined. The Defendants had explained that they adopted this sampling system as it was not possible to unwind the whole 160 meter *VST* reel to take samples and as they had indicated this method of sampling to the Plaintiffs. Further unwinding

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the reels and rewinding them might cause damage to some of the individual *VSTs*. I had examined some of the VSTs which were quite pliable on some pressure being applied to them and it was plain that the VSTs had to be handled with care. The Defendants' evidence was that strictly the contact gap of only 5 of the reels of *VSTs* were within the specification of 0.40mm +/-5mm. They accepted these reels and made the *connectors* from these *VSTs*. They also further accepted the remaining 7 reels of *VSTs* although the contact gap in them was marginally above the threshold of 0.45mm and also made *connectors* from them. DW1, explaining the rationale for the acceptance in his Affidavit, said:

65 '*VST* terminals with contact gap not exceeding 0.48mm can still be used because the dimension of the head pin with which the *VST* terminal was to 'mate' was 0.495mm. However, to err on the side of caution, I only accepted reels where samples taken showed a dimension of less than 0.47mm. '

66 9.3 The Defendants testified that on 8.3.95 and 9.3.95, Seagate to whom the *connectors* were sold, rejected them after a sampling examination as is shown in **DB28-DB30** in which every sample taken was rejected on the ground that the sample *connectors* had a 'low withdrawal force causing intermittent contact'. The Defendants' defence and their counterclaim was based on this rejection by Seagate of the *connectors* supplied to them which the Defendants had described as being 'out of specification' and hence defective. The thrust of the Defendants' case was to link the manufacture of the rejected *connectors* with the 24 reels of *VSTs* supplied to them on 7.2.95, 17 of which reels they contended had a contact gap of above the contractual threshold of 0.45mm i.e. they were defective. The VSTs were therefore not in accordance with the test run samples originally approved by the Defendants. Defence Counsel submitted that the Defendants' conduct in accepting and using seven of the defective reels

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did not matter and they could still claim damages against the Plaintiffs as set out in the counter-claim. I shall deal with the Defendants' Counsel's submission on the matter later.

67 9.4 The Defendants further contended at the same time, that they had taken adequate quality control measures concerning the receipt of *VSTs* from the Plaintiffs and thereafter concerning the manufacture of the *connectors* from the *VSTs* and had conducted:

68 (i) incoming checks

69 (ii) set up checks

70 (iii) in process checks and

71 (iv) outgoing checks

72 and gave evidence of the same. One Loo Chon Chui, a B.Sc graduate, DW4, having a Lead Assessors ISO 900 certificate and a consultant with two companies also dealing in *connectors* testified by his report and evidence that the Defendants' manufacturing process of the *connectors* was a proper one.

73 9.5 The Defendants also brought into question the related issue of whether the Plaintiffs on the other hand, had a proper manufacturing and quality control process in making the *VSTs*.

74 10. The Plaintiffs denied the allegation against them and severely criticised the Defendants' checks, manufacturing and quality control processes which the Plaintiffs submitted, was instrumental in producing the defective

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connectors. The Plaintiffs further emphasised the Defendants' indecisiveness and neglect in rectifying the situation speedily, in fact not at all, when faced with samples of the rejected *connectors* after having been given time by Seagate to do so and after having been told what the problems were. Consequently, the rejection of their business with Seagate, if any, resulted from the Defendants' own conduct for which the Defendants were solely responsible for and for which no liability attached to the Plaintiffs.

75 10.1 I found the Defendants' Counsel's submissions to link the rejected *connectors* made by the Defendants and supplied to Seagate from the 12 reels of VSTs accepted by the Defendants as being tenuous. In the first place, the Defendants provided no proof that the *connectors* were made from the batch of VSTs sold under the impugned Invoice No. 0403 dated 17.2.95. A large number of VSTs had been sold to them in the ten days prior to 17.2.95. Secondly, if so made from the VSTs sold on 17.2.95, no *connectors* were made by the Defendants from 12 of the 24 reels of VSTs supplied on that day as 12 reels of VSTs were rejected by the Defendants. Thirdly, again, if the *connectors* were so made from the remaining 12 reels of VSTs they were admittedly accepted by the Defendants after inspection. Fourthly, on DW1's own evidence the 'mating' headpin was 0.495mm, and, DW1, had not selected as he said so, any VST where the VST's contact gap exceeded 0.47mm. The contact gap in the VSTs that were accepted was therefore clearly narrower than the 'mating' headpin and with a bit of elasticity in the frame of the slender VST, DW1 obviously anticipated as a Service Quality Assurance Engineer, a snug fit by the slightly larger sized headpin. The fault therefore was, in my opinion, in the Defendants' manufacturing process thereafter. Five of the VST reels, almost half the number accepted by the Defendants had VSTs which were completely within specifications. The Defendants had no complaints against the VST reels from

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which no doubt nearly half the *connectors* supplied to Seagate would have been made. Assuming for a moment that the Defendants' manufacturing processes were proper and sound as stated in evidence by them, then slightly less than half of the *connectors* made by the Defendants would have been absolutely within specifications. Yet it was the Defendants' evidence that everyone of the *connector* samples picked by Seagate from the batch of *connectors* sold by the Defendants to the Plaintiffs from the 12 accepted reels was out of specification and hence for that reason defective. The Defendants failed to enlighten me how this could have happened in the circumstances.

76 10.2 A further factor which hardly favoured the Defendants was that although they had conducted sample checks and accepted 12 reels of VSTs on 17.2.95 the same reels after their acceptance were delivered by them to a firm of electro-platers for the VSTs to be electro-plated which meant that the electro-plating firm would unwind, electroplate each VST and then rewind each reel. The Defendants failed to furnish prove that they conducted any sampling of the VSTs after their return from electroplating to show that the VSTs were not in any way stretched as I had observed they could be and their contact gaps possibly enlarged through mishandling by the electroplating firm by rewinding the reels improperly i.e. either loosely or tightly. The Defendants' conclusions on tight winding of reels and hence improperly which I shall refer to later, supports my observation. Once goods had been accepted by the Defendants all risk concerning the handling of the goods by them or their agents thereafter would also pass and be assumed by them.

77 10.3 As for the Plaintiffs' own in-process checks in manufacturing the VSTs, I accept the Plaintiffs' Counsel's submission and the evidence adduced by the Plaintiffs in **PB167-191** and in **Exh. P2(1-26)**. It showed that the

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Plaintiffs had conducted two-hourly in-process checks on the contact gap when manufacturing their VSTs. The VSTs manufactured between 16.11.94 to 8.3.95 **Exhs. PB167-191** showed the sampling measurements of the contact gap at regular intervals to be within specifications. The integrity of these in-process checks was not challenged by the Defence when Lim Kim Hwa @ Bernie Lim, PW2, the Plaintiffs' Quality Assurance Manager testified. The Defendants' witness, Operations Manager Tan Puay Tong, DW2, later merely offered the criticism that the Plaintiffs should have practised Statistical Process Control (SPC) which measures how stable the process is through plotting charts of the contact gap readings to give a trend. This the Plaintiffs did not do according to him. However, the SPC procedure was never put to PW2 to elicit his response as to whether such a practice was viable. When asked by the Court on the other hand, if the Defendants practised SPC, DW2 stated they were not required to do so before but only started practising it from May 1994 i.e. after Seagate recommended that they should do so. As the Defendants did not challenge the integrity of **Exhs. PB167-191**, the results therein are binding on the Defendants. The absence of an SPC chart was at most an additional requirement which did not in any way impair the statistical information in **Exhs. PB167-191** in the circumstances. The accepted results in **Exhs. PB167-191** also explain PW2's evidence in respect of the 12 rejected reels which the Defendants found were 'out of specification' after examining samples from the initial stretch of the VST chain namely that there was no manufacturing fault on the part of the Plaintiffs but in all probability there was a mishandling of the reels as for example in PW2's opinion, through loose winding of the VSTs onto the reel. PW2 did not exclude the possibility of the Plaintiffs themselves mishandling the 12 reels of VSTs after manufacture and as such had in any case agreed to deduct the charges for these reels - and not because of a manufacturing fault by them. PW2 had testified that he had taken the defective reels back from the Defendants who had

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placed them in quarantine in their factory and had studied the VSTs in them and traced and compared them with one meter strips of VST samples which had been cut off and labelled with production dates and numbers and other information during the two-hourly checks and had thus come to the conclusion that it was not a production fault. The Defence again did not seriously challenge PW2's conclusion. Indeed in accordance with a covering letter **DB33** dated 13.3.95, DW1 informed T F Yin of Seagate with an accompanying Corrective Action Report **DB34-38** (*'13 Mar CAR'*) that the Defendants had found the root cause of the problem to be over-pulling of terminals during reeling. The letter read:

78 "Please find attached a copy of corrective action for the above problem.

79 We have found that **the root cause** of the problem come from over-pulling of terminals during reeling. This essentially caused the portion at the core to be depressed under pressure and thus widen the contact gap. Our investigation showed that over-pulling could cause a 2 mil difference between the outer reel of terminals and the inner reel. (See Root Cause item #4) Samples will be brought to you for verification. (**emphasis added**)

80 We had discounted the fact over-insertion had caused the 19/20 mils contact gap. Our investigation showed that the maximum contact gap could open is 18 mil. (See root cause item #2).

81 Our durabiblity test had showed no failures in contact resistance, insertion and withdrawal force with contact gap ranging from 15 to 18 mils after 100 cycles.

82 The preventive actions that will be taken are as follow:

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83 1. Practice SPC of contact gap at stamping and assembly to monitor any shift of process averages.

84 2. Discarding a foot of terminals after plating to eliminate potential contact gap out of specs.

85 3. Institute check on contact gap after plating to ensure conformance of contact gap.

86 Please do not hesitate to contact me if you have any query."

87 10.4 DW2, admitted that after Seagate had rejected the Defendants' *connectors*, he did not conduct any investigation into the Plaintiffs' manufacturing process or call for the Plaintiffs' in-process inspection reports or visit the Plaintiffs' factory to find out if the Plaintiffs were the cause for the rejections. The Defendants had attempted to blame a chip on the corner of the 'Punch' which was made of carbide or steel as being a cause of the contact gap in the VSTs being wider than the specifications during the metal stamping. It was PW2's evidence that there was no relationship between the slightly chipped 'Punch' and the contact gaps. The chip in a corner did not interfere with the forming of the contact gap at all as was explained by PW2 concerning the process of stamping and producing the VSTs and the contact gap in them. I examined the styrofoam model of the die and insert and the punch, **Exh.P8** and the area marked red on the 'Punch' where PW2 said the chip was. I was satisfied in the absence of defence cross-examination showing any other conclusion that the chipped off part did not adversely affect the VST producing as the chipped off part would not form any contact with the slender metal strip insert which is

punched to form the VST and its contact gap. The process is not unlike that of the humble ‘hole puncher’ used in the office.

88 10.5 I further observed that the Defendants did not query or show any interest in the chipped punch when the Plaintiffs informed them of the same on 10 March 1995 by fax after the Defendants had verbally told PW1 to check their tooling as the contact gap was running on the higher side. PW1 testified that on checking their records he had found that the forming punch had been changed on 15/2/95 and the fax had also stated:

89 "At that point of time, the contact gap was running in the margin of 0.42 - 0.44mm."

90 This gap was within the upper threshold limit of 0.45mm. The Defendants had not taken issue with the Plaintiffs’ records.

91 10.6 After the rejection of the *connectors* by Seagate on 8.3.94 and 9.3.94 the Defendants had as I have said issued the *13 Mar CAR* to Seagate informing them of their problems and steps they were taking to produce VSTs with contact gaps within the specifications required by Seagate. The Defendants in that report listed a number of corrective actions they intended to take which contributed to the intermittent contact gap problem as follows:

92 "Root Cause (Problem Analysis): % Contribution

93 **1.** Control of contact gap at

94 stamping from a maximum of 1

6.5 mils to 17.5 mils causing final

gap after assembly to run to high

side of specification. Specification

of parts was set at 13.8 to 18 mils -

and the shift in gap was not alerted.

(see attached).

2. Overinsertion of terminals into Discounted after full

the housing. investigation.

(See appendix test conducted.)

3. Due to change of inserts in the die.

(See appendix). 5%

4. Due to over-pulling of stamping reels,

thus causing the portion near the core 95%

tend to be depressed under pressure and

widen the contact gap.

(See appendix and drawing).

111 10.7 A further amended report was also sent on 23 March 1995 (*"23 Mar CAR"*) where an item **5** was added to the above 4 items as follows:

112 "**5.** Contact gap shifted during stamping. (See attached finding). The frequency to adjust contact gap punch was not determined. As a result, some reels could have shifted to the high side, or even out of spec."

113 The emphasis on "the root cause" in the covering letter of the *13 Mar CAR* being due to overpulling of the VST during reeling and this causing a 95% contribution to the defect as stated above had now evolved inexplicably into ‘contact gap shifted during stamping ...". The Defendants had further claimed that PW1 was a team member producing the *23 Mar CAR*. However, it emerged in Court (unchallenged) that he had never been a team member and that the Defendants had never really got the Plaintiffs involved in the Defendants’ efforts to overcome any production problem as stated by them in the said report to Seagate. In fact DW2 admitted in his evidence:

114 "Bernie Lim did not participate".

115 The Plaintiffs had also denied receiving the amended *23 Mar CAR* from the Defendants and the Defendants had failed to prove that it had been then sent to the Plaintiffs except for the say so of DW2.

116 Item 5 - blaming the Plaintiffs, was set out without consulting the Plaintiffs. It was, in my opinion, a serious impropriety causing me to doubt the credibility of DW1.

117 10.8 However, I might mention that at some time during this time all PW1 had been (as he testified) informed by DW1 in a telephonic conversation

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to do was to reduce the contact gap from the contractual 0.40mm +/-05 to 0.38mm +/-05 to no doubt overcome the problem of the loose contact gap. The Plaintiffs who had not known the full problems of the Defendants, were willing to do so. **The Plaintiffs had consequently sent a quotation in the sum of $1,200/- for the modification to their production machines but the Defendants surprisingly never followed the matter up thereafter.** Instead, the Defendants admitted continuing using the Plaintiffs VSTs from stacks that had been sold to them for trial runs from March 1995 to early 1996 (some nine months) showing that they had not lost confidence in the Plaintiffs' VSTs.

118 10.9 The Defendants' evidence that their system of manufacturing the *connectors* and in-process and other checks stated earlier ensured that they had a good and proper manufacturing process and that they did not assemble the faulty *connectors* which had 'out of specification' contact gap was highly unsatisfactory in my opinion. In the first place in its *13 Mar and 23 Mar CAR*s the Defendants had recommended a number of corrective actions to be taken by themselves. DW1 had admitted in evidence that the Defendants had not been practising any of the quality control actions i.e.

119 "Corrective Actions (Possible Solutions):

120 #1. To practice SPC to monitor contact From next production lot.

121 gap for stamping and assembly.

122 #3. To qualify all new inserts at final assembly 15 Mar 95

123 on contact gap. Seagate will be informed

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of change of inserts if it is done.

#5a. In addition to #1, stamping production Next production will furnish contact gap data for every reel of terminals. Ranoda will verify the data.

#5b. At production control, every reel of Next Production terminal will be assigned to a specific job ticket. The contract gap measurement will be taken at the start and the end of every reel. This measurement will be verified before shipment.

#5c. For every deliveyr of part to Seagate Next Production SPC charts of contact gap, row to ro pitch and side to side pitch will be furnished.

#5d. To establish Process Average for core Next Production hole dimension on the housing.

#5e. Final inspection in Ranoda will be 0.1% Next Production

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140 AQL.

141 #5f. Molding to use wire mesh to separate Next Production

142 gating from housing.

143 #5g. Final Product specification on contact gap To be reviewed

144 to be 16.5 mil max and at stamping to be

145 controlled at 14.5 +/-2 mil.

146 10.10 In fact when Plaintiffs' Counsel *put* to DW2 the comments Seagate had made at **DB42** and which are stated below and that the Defendants had a very serious quality assurance problem in 1995, DW2 answered:

147 "Yes".

148 10.11 Some two months later in May 1995 Seagate issued a *'Performance Profile'* on the Defendants in which it stated amongst other things:

149 Problem Issues

150 * Senoko encountered various problems on Ranoda's J2 receptacle. These problem including collapsed contact, mating hole blocked by runner's gate or foreign particles, mold flash, short mold and loose contact.

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151 * Kallang report a consistant 1% defect on the above problems for the whole months of Jan and Feb. These shown Ranoda does not have an effective containment actions in place.

152 * Senoko reported a 5.5% collapsed contact on a particular lot of J2 receptacle. These shown Ranoda has a very poor out-going inspection system.

153 * The receptacle contact gap out of specification. This is a recurring issue. Seagate had this problem during the last quarter. This time Senoko has to rework more than 6500 PCBAs. The root cause of the problem is Ranoda's stamping house does not practise SPC.

154 * Ranoda's DPPM on J2 receptacle is a sky high of 45337.

155 (Kallang and Senoko are Seagate's branches).

156 Then again in July 1995 - 4 months later - Seagate issued another *'Performance Profile'* on the Defendants categorising its performance as **'Marginal'** from a range of 'Excellent' to 'Unacceptable'. It was plain from all the evidence that the Defendants had neglected to address themselves on the issue of the contact gap being 'out of specification' aggressively or at all by consulting the Plaintiffs and getting to the bottom of the problem and rectifying any problems **if** they were the Plaintiffs as advocated by the Defendants.

157 11. I found the Defendants' manufacturing method of *connectors* to be unsound and in my opinion, it was their inadequate work system and manufacturing process that caused the contact gap to be produced 'out of specification'. DW1's evidence was that after the reels of VST had undergone cutting in lengths of 7 VSTs by machine, the cut lengths were stored in an A4

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size tray of 9 compartments. The pieces were just dropped inside the tray and when asked if the cut VSTs could entangle he said they could. A worker would then manually put in and slot each strip of cut VST into a plastic *connector* housing as automated machines to do all the assembly had yet to be brought in. The Defendants' worker **would align the VSTs strip over the holes in the housing** and the VSTs would then be pushed in by machine. In other words it was a semi-automatic operation where the worker formed up the VSTs **manually** in the housing for machine pressing. He agreed that there was room for operational error and the most common one was that the terminal may not sit in the holes properly when put there **manually** and the VST would then be crushed when it was pressed by the machine into the plastic housing. DW1 added:

158 **"If operator does not notice then they will just go through and later the *connector* will not function or not function properly".**

159 DW1 also stated that proper insertion of the VST into the holes was important and it required skill and concentration and that the presence of fully automated machines would make better *connectors*.

160 11.1 The Defendants adduced evidence through DW4 their expert witness as stated earlier who testified that he had been briefed by the Plaintiffs as to how the connectors were assembled. He concluded that the Defendants' assembly whilst it did produce slight widening of the contact gap it did not, however, significantly contribute to the production of VSTs being out of specification. He had himself, he said, assembled six *connectors* as practised by the Defendants and the contact gap was within specification.

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161 11.2 I found the evidence of DW4 in his report and in Court to be of little or no value as DW4 had been instructed to make his evaluations some 2 yeas after the event and close to the trial date. He had no opportunity to examine the whole of the Defendants' manufacturing system. In his evidence, DW4 stated that he assembled the *connectors* and used a hand tool which the Defendants had instructed him the workers used to press the VSTs into the housing. The evidence on the other hand of DW1 earlier was that their factory used a semi-automatic or pneumatic process which pressed the VSTs into the plastic housing automatically whereas DW1 described a manual method of pressing the VSTs into the housing one by one with the hand tool. I agreed with the Plaintiffs' Counsel that the Defendants had misinformed DW4 as to the actual production method employed. I also found DW4's evaluation to be very narrow in scope and DW4 had also not examined nor was shown the Defendants' quality assurance processes or in-process checks. DW4 was not asked to investigate nor did investigate why the contact gap widened at all (though as he said not significantly) when put into the plastic housing. DW4 in any case agreed that a worker working for some eight hours assembling connectors by a semi-automatic method as stated earlier had to use care and skill all the time and the fatigue element would come into play although rest may be provided.

162 11.3 As for the Defendants' in-process checks, Seagate's *Performance Profile* report in May had criticised another important area as well. The Defendants had a lot more to do to achieve an acceptable process capability index ('**cpk**') of 1.5. The Defendants were obviously not achieving the '**cpk**' of 1.5or above. The higher the index the more consistent would be the quality of the *connectors*. According to DW1's evidence anything more than 1.33 was good index. However, Seagate required the **cpk** to be 1.5 or above to ensure that

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the contact gap was consistently within specification. I also observed that to do the '**cpk**' the Defendants' practice was to take **32** samples to test the size of the contact gap for a lot of say **7,800** pieces as stated by DW1 when in accordance with the Defendants' own exhibit of a table *'Acceptance Sampling Plan Process - **Exh. D4**',* the sampling size should have been **200** pieces for lot size of **3,201 - 10,000** pieces. In that regard, therefore, the Defendants failed to have a proper in-process check.

163 11.4 In the May 1994 *Performance Profile* Seagate had not only a problem with contact gap size concerning the *connectors* supplied by the Defendants but Seagate had also listed as shown in the portion of their *Performance Profile* of May 1995 (which I quoted earlier), many other problems encountered with the *connectors* such as collapsed contact, mating hole blocked by runner's gate or foreign particles, mould flesh and short mould besides. Collapsed contacts on a particular lot constituted about 5.5% of the *connectors* supplied. This was no doubt due to the improper manual insertion of the VSTs into the plastic housing holes. The same improper manual process in my opinion when the VSTs were pressed into the holes could equally have caused the unacceptable widening of the contact gaps as found by Seagate if the VSTs had already not been overstretched during re-reeling after electro-plating or by their combination.

164 11.5 The Defendants having accepted 12 of the 24 reels of VSTs on 17.2.94 and other reels as supplied before and after 17.2.94 after due examination as they claimed and having used them and in the light of all the other evidence I have discussed, I found that the probabilities of the case showed that it was:

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165 i) the Defendants' inadequate manufacturing process and inadequate in-house checks which produced the 'out of specification' contact gaps in the VSTs when housed in the plastic containers to form the *connectors*;

166 ii) their neglect or lackadaisical approach in implementing corrective action and resolving the problem of the defective *connectors* as stipulated by Seagate after being given more than adequate time to do so.

167 11.5 I also found that the sale to the Defendants of the VSTs was not by sample as contended by the Defendants but a simple contractual one. No evidence of an intention that the sale was to be by sample was adduced or identified. The relevant contract provided for a specific sized contact gap in the VST (as per drawings for part S50630-200-00) with a stated variation of error. The test run strips did not constitute a sample but was an assurance that the Plaintiffs' manufacturing system could provide the VSTs of the required specific contact gap. The Defendants are deemed in my opinion, to have accepted the 12 reels of VSTs including those with marginally higher error tolerance as the Defendants had a reasonable opportunity to examine and had examined them and found them acceptable as explained by them. Any defect was apparent on reasonable examination as was evident. They had also thereafter electroplated them, cut them into small pieces, inserted them into plastic housing. All these acts were validly inconsistent with the ownership of the Plaintiffs. In ***Mechan & Sons Ltd v Bow, McLachlan & Co Ltd*** [1910] S.C. 758 the Court held that the fitting of tanks into the tugs was an act which was inconsistent with the ownership of the sellers and that the shipbuilders accordingly were barred from later rejecting the tanks. By their acceptance of the 7 reels of VSTs with contact gaps very fractionally above the threshhold limit of 0.45mm the Defendants had elected to waive the underlying term or

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condition of the contract that the upper threshhold not exceed 0.45mm at all. The Defendants never elected to treat the breach of the condition as a breach of warranty entitling them to sue in damages as they claimed at the trial. They had not informed the Plaintiffs at the relevant time of this at all. Indeed they were not entitled to do so at all as the required specification of the contact gap being a fundamental term of the condition of the contract, the contract could not be severed. It was a simple question of waiver or total rejection of the 7 reels of VSTs.

168 11.6 In the present case, there was also no evidence that the Defendants raised any complaint about the VSTs until the commencement of the action. On the contrary, as late as 26.7.95 the Plaintiffs' representative one Wong Siew Fen ('Wong') and the Defendants' representative Lui P.H. ('Lui') met and discussed the balance amount due and owing to the Plaintiffs concerning the VSTs including other amounts on account of goods sold to them for which amounts Wong had been chasing Lui for payment earlier. According to PW1, the Plaintiffs' Managing Director, Lui agreed to pay all sums owed in ***five*** **instalments as they were having a cash flow problem.** PW1 confirmed the discussion and agreement in a letter dated 27.7.95 to the Defendants and had also sent out a further letter to the same effect on 5.9.95. The Defendants failed to respond either by payment or by way of reply to both letters. The Defendants' silence did not speak in their favour.

169 I was also led to draw the reasonable inference that the Defendants having in March embarked on a plan to modify the metal stamping machinery with the Plaintiffs and the Plaintiffs having given them a quotation they did not follow it through because they probably knew that what was really at fault was their manufacturing system as was evident for example from the 5.5% crushed

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VSTs when inserted into the plastic housing to form *connectors* at their end which was not fully automated and that no doubt to have a fully automated system, they had to spend more money but could not afford to do so because of cash flow problems.

170 12. The Defendants' claim of loss and damage as I have set out earlier which itself was not strictly proved, was in the circumstances without any merit. The Defendants were the authors of their own misfortune. The Defendants had not produced documents or called any witness especially from Seagate or show any credible evidence that their existing orders placed with Seagate for other products had been cancelled by Seagate because of the rejection of the defective *connectors* they supplied. As such, I gave judgment for the Plaintiffs in respect of the balance of their claim with interest and dismissed the Defendants' counterclaim.

171 Dated this 12th day of December 1997

172 **AMARJEET SINGH**

173 **JUDICIAL COMMISSIONE**

Amarjeet Singh JC

Tan Hong Seng assisted by Marilyn Chia (Tan Lim & Wong) for the plaintiffs

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Sally Yang assisted by Chiong Meng Chuan (Colin Ng & Partners)
for the defendants
