รายการอ้างอิง

ภาษาไทย

ปราโมทย์ เดชะอำไพ. ระเบียบวิธีเชิงตัวเลขในงานวิศวกรรม. พิมพ์ครั้งที่ 1. สำนักพิมพ์จุฬาลงกรณ์มหาวิทยาลัย, 2538.

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ภาคผนวก ก

รูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

ตารางที่ ก แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
0	0	IDLE
1	0	IDLE
2	0	IDLE
3	0	IDLE
4	0	IDLE
5	0	IDLE
6	0	IDLE
7	0	IDLE
8	0	IDLE
9	0	IDLE
10	0	IDLE
11	0	IDLE
12	1.042	GEA1
13	2.083	GEA1
14	3.125	GEA1
15	4.167	GEA1
16	4.167	GEA1
17	4.167	GEA1
18	4.167	GEA1
19	4.167	GEA1
20	4.167	GEA1
21	4.167	GEA1
22	4.167	GEA1
23	4.167	GEA1
24	3.472	GEA1
25	2.778	GEA1
26	1.852	CHNG
27	0.926	CHNG
28	0	CHNG
29	0	IDLE
30	0	IDLE

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
31	0	IDLE
32	0	IDLE
33	0	IDLE
34	0	IDLE
35	0	IDLE
36	0	IDLE
37	0	IDLE
38	0	IDLE
39	0	IDLE
40	0	IDLE
41	0	IDLE
42	0	IDLE
43	0	IDLE
44	0	IDLE
45	0	IDLE
46	0	IDLE
47	0	IDLE
48	0	IDLE
49	0	IDLE
50	0.833	GEA1
51	1.667	GEA1
52	2.5	GEA1
53	3.333	GEA1
54	4.167	GEA1
55	4.167	CHNG
56	4.167	CHNG
57	5.111	GEA2
58	6.056	GEA2
59	7	GEA2
60	7.944	GEA2

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
61	8.889	GEA2
62	8.889	GEA2
63	8.889	GEA2
64	8.889	GEA2
65	8.889	GEA2
66	8.889	GEA2
67	8.889	GEA2
68	8.889	GEA2
69	8.889	GEA2
70	8.889	GEA2
71	8.889	GEA2
72	8.889	GEA2
73	8.889	GEA2
74	8.889	GEA2
75	8.889	GEA2
76	8.889	GEA2
77	8.889	GEA2
78	8.889	GEA2
79	8.889	GEA2
80	8.889	GEA2
81	8.889	GEA2
82	8.889	GEA2
83	8.889	GEA2
84	8.889	GEA2
85	8.889	GEA2
86	8.125	GEA2
87	7.361	GEA2
88	6.597	GEA2
89	5.833	GEA2
90	5.069	GEA2

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
91	4.306	GEA2
92	3.542	GEA2
93	2.778	GEA2
94	1.852	CHNG
95	0.926	CHNG
96	0	CHNG
97	0	IDLE
98	0	IDLE
99	0	IDLE
100	0	IDLE
101	0	IDLE
102	0	IDLE
103	0	IDLE
104	0	IDLE
105	0	IDLE
106	0	IDLE
107	0	IDLE
108	0	IDLE
109	0	IDLE
110	0	IDLE
111	0	IDLE
112	0	IDLE
113	0	IDLE
114	0	IDLE
115	0	IDLE
116	0	IDLE
117	0	IDLE
118	0.833	GEA1
119	1.667	GEA1
120	2.5	GEA1

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
121	3.333	GEA2
122	4.167	GEA2
123	4.167	GEA2
124	4.167	GEA2
125	4.784	GEA2
126	5.401	GEA2
127	6.019	GEA2
128	6.636	GEA2
129	7.253	GEA2
130	7.87	GEA2
131	8.488	GEA2
132	9.105	GEA2
133	9.722	GEA2
134	9.722	CHNG
135	9.722	CHNG
136	10.243	GEA3
137	10.764	GEA3
138	11.285	GEA3
139	11.806	GEA3
140	12.326	GEA3
141	12.847	GEA3
142	13.368	GEA3
143	13.889	GEA3
144	13.889	GEA3
145	13.889	GEA3
146	13.889	GEA3
147	13.889	GEA3
148	13.889	GEA3
149	13.889	GEA3
150	13.889	GEA3

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
151	13.889	GEA3
152	13.889	GEA3
153	13.889	GEA3
154	13.889	GEA3
155	13.889	GEA3
156	13.368	GEA3
157	12.847	GEA3
158	12.326	GEA3
159	11.806	GEA3
160	11.285	GEA3
161	10.764	GEA3
162	10.243	GEA3
163	9.722	GEA3
164	9.722	GEA3
165	9.722	GEA3
166	9.722	GEA3
167	9.722	GEA3
168	9.722	GEA3
169	9.722	GEA3
170	9.722	GEA3
171	9.722	GEA3
172	9.722	GEA3
173	9.722	GEA3
174	9.722	CHNG
175	9.722	CHNG
176	9.722	GEA2
177	9.722	GEA2
178	9.722	GEA2
179	8.73	GEA2
180	7.738	GEA2

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
181	6.746	GEA2
182	5.754	GEA2
183	4.762	GEA2
184	3.77	GEA2
185	2.778	GEA2
186	1.852	CHNG
187	0.926	CHNG
188	0	CHNG
189	0	IDLE
190	0	IDLE
191	0	IDLE
192	0	IDLE
193	0	IDLE
194	0	IDLE
195	0	IDLE
196	0	IDLE
197	0	IDLE
198	0	IDLE
199	0	IDLE
200	0	IDLE
201	0	IDLE
202	0	IDLE
203	0	IDLE
204	0	IDLE
205	0	IDLE
206	0	IDLE
207	1.042	GEA1
208	2.083	GEA1
209	3.125	GEA1
210	4.167	GEA1

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
211	4.167	GEA1
212	4.167	GEA1
213	4.167	GEA1
214	4.167	GEA1
215	4.167	GEA1
216	4.167	GEA1
217	4.167	GEA1
218	4.167	GEA1
219	3.472	GEA1
220	2.778	GEA1
221	1.852	CHNG
222	0.926	CHNG
223	0	CHNG
224	0	IDLE
225	0	IDLE
226	0	IDLE
227	0	IDLE
228	0	IDLE
229	0	IDLE
230	0	IDLE
231	0	IDLE
232	0	IDLE
233	0	IDLE
234	0	IDLE
235	0	IDLE
236	0	IDLE
237	0	IDLE
238	0	IDLE
239	0	IDLE
240	0	IDLE

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
241	0	IDLE
242	0	IDLE
243	0	IDLE
244	0	IDLE
245	0.833	GEA1
246	1.667	GEA1
247	2.5	GEA1
248	3.333	GEA1
249	4.167	GEA1
250	4.167	CHNG
251	4.167	CHNG
252	5.111	GEA2
253	6.056	GEA2
254	7	GEA2
255	7.944	GEA2
256	8.889	GEA2
257	8.889	GEA2
258	8.889	GEA2
259	8.889	GEA2
260	8.889	GEA2
261	8.889	GEA2
262	8.889	GEA2
263	8.889	GEA2
264	8.889	GEA2
265	8.889	GEA2
266	8.889	GEA2
267	8.889	GEA2
268	8.889	GEA2
269	8.889	GEA2
270	8.889	GEA2

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
271	8.889	GEA2
272	8.889	GEA2
273	8.889	GEA2
274	8.889	GEA2
275	8.889	GEA2
276	8.889	GEA2
277	8.889	GEA2
278	8.889	GEA2
279	8.889	GEA2
280	8.889	GEA2
281	8.125	GEA2
282	7.361	GEA2
283	6.597	GEA2
284	5.833	GEA2
285	5.069	GEA2
286	4.306	GEA2
287	3.542	GEA2
288	2.778	GEA2
289	1.852	CHNG
290	0.926	CHNG
291	0	CHNG
292	0	IDLE
293	0	IDLE
294	0	IDLE
295	0	IDLE
296	0	IDLE
297	0	IDLE
298	0	IDLE
299	0	IDLE
300	0	IDLE

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
301	0	IDLE
302	0	IDLE
303	0	IDLE
304	0	IDLE
305	0	IDLE
306	0	IDLE
307	0	IDLE
308	0	IDLE
309	0	IDLE
310	0	IDLE
311	0	IDLE
312	0	IDLE
313	0.833	GEA1
314	1.667	GEA1
315	2.5	GEA1
316	3.333	GEA1
317	4.167	GEA1
318	4.167	CHNG
319	4.167	CHNG
320	4.784	GEA2
321	5.401	GEA2
322	6.019	GEA2
323	6.636	GEA2
324	7.253	GEA2
325	7.87	GEA2
326	8.488	GEA2
327	9.105	GEA2
328	9.722	GEA2
329	9.722	CHNG
330	9.722	CHNG

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
331	10.243	GEA3
332	10.764	GEA3
333	11.285	GEA3
334	11.806	GEA3
335	12.326	GEA3
336	12.847	GEA3
337	13.368	GEA3
338	13.889	GEA3
339	13.889	GEA3
340	13.889	GEA3
341	13.889	GEA3
342	13.889	GEA3
343	13.889	GEA3
344	13.889	GEA3
345	13.889	GEA3
346	13.889	GEA3
347	13.889	GEA3
348	13.889	GEA3
349	13.889	GEA3
350	13.889	GEA3
351	13.368	GEA3
352	12.847	GEA3
353	12.326	GEA3
354	11.806	GEA3
355	11.285	GEA3
356	10.764	GEA3
357	10.243	GEA3
358	9.722	GEA3
359	9.722	GEA3
360	9.722	GEA3

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
361	9.722	GEA3
362	9.722	GEA3
363	9.722	GEA3
364	9.722	GEA3
365	9.722	GEA3
366	9.722	GEA3
367	9.722	GEA3
368	9.722	GEA3
369	9.722	GEA3
370	9.722	GEA3
371	9.722	GEA3
372	9.722	CHNG
373	9.722	CHNG
374	8.73	GEA2
375	7.738	GEA2
376	6.746	GEA2
377	5.754	GEA2
378	4.762	GEA2
379	3.77	GEA2
380	2.778	GEA2
381	1.852	CHNG
382	0.926	CHNG
383	0	CHNG
384	0	IDLE
385	0	IDLE
386	0	IDLE
387	0	IDLE
388	0	IDLE
389	0	IDLE
390	0	IDLE

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
391	0	IDLE
392	0	IDLE
393	0	IDLE
394	0	IDLE
395	0	IDLE
396	0	IDLE
397	0	IDLE
398	0	IDLE
399	0	IDLE
400	0	IDLE
401	0	IDLE
402	1.042	GEA1
403	2.083	GEA1
404	3.125	GEA1
405	4.167	GEA1
406	4.167	GEA1
407	4.167	GEA1
408	4.167	GEA1
409	4.167	GEA1
410	4.167	GEA1
411	4.167	GEA1
412	4.167	GEA1
413	4.167	GEA1
414	3.472	GEA1
415	2.778	GEA1
416	1.852	CHNG
417	0.926	CHNG
418	0	CHNG
419	0	IDLE
420	0	IDLE

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
421	0	IDLE
422	0	IDLE
423	0	IDLE
424	0	IDLE
425	0	IDLE
426	0	IDLE
427	0	IDLE
428	0	IDLE
429	0	IDLE
430	0	IDLE
431	0	IDLE
432	0	IDLE
433	0	IDLE
434	0	IDLE
435	0	IDLE
436	0	IDLE
437	0	IDLE
438	0	IDLE
439	0	IDLE
440	0.833	GEA1
441	1.667	GEA1
442	2.5	GEA1
443	3.333	GEA1
444	4.167	GEA1
445	4.167	CHNG
446	4.167	CHNG
447	5.111	GEA2
448	6.056	GEA2
449	7	GEA2
450	7.944	GEA2

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
451	8.889	GEA2
452	8.889	GEA2
453	8.889	GEA2
454	8.889	GEA2
455	8.889	GEA2
456	8.889	GEA2
457	8.889	GEA2
458	8.889	GEA2
459	8.889	GEA2
460	8.889	GEA2
461	8.889	GEA2
462	8.889	GEA2
463	8.889	GEA2
464	8.889	GEA2
465	8.889	GEA2
466	8.889	GEA2
467	8.889	GEA2
468	8.889	GEA2
469	8.889	GEA2
470	8.889	GEA2
471	8.889	GEA2
472	8.889	GEA2
473	8.889	GEA2
474	8.889	GEA2
475	8.889	GEA2
476	8.125	GEA2
477	7.361	GEA2
478	6.597	GEA2
479	5.833	GEA2
480	5.069	GEA2

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
481	4.306	GEA2
482	3.542	GEA2
483	2.778	GEA2
484	1.852	CHNG
485	0.926	CHNG
486	0	CHNG
487	0	IDLE
488	0	IDLE
489	0	IDLE
490	0	IDLE
491	0	IDLE
492	0	IDLE
493	0	IDLE
494	0	IDLE
495	0	IDLE
496	0	IDLE
497	0	IDLE
498	0	IDLE
499	0	IDLE
500	0	IDLE
501	0	IDLE
502	0	IDLE
503	0	IDLE
504	0	IDLE
505	0	IDLE
506	0	IDLE
507	0	IDLE
508	0.833	GEA1
509	1.667	GEA1
510	2.5	GEA1

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
511	3.333	GEA1
512	4.167	GEA1
513	4.167	CHNG
514	4.167	CHNG
515	4.784	GEA2
516	5.401	GEA2
517	6.019	GEA2
518	6.636	GEA2
519	7.253	GEA2
520	7.87	GEA2
521	8.488	GEA2
522	9.105	GEA2
523	9.722	GEA2
524	9.722	CHNG
525	9.722	CHNG
526	10.243	GEA3
527	10.764	GEA3
528	11.285	GEA3
529	11.806	GEA3
530	12.326	GEA3
531	12.847	GEA3
532	13.368	GEA3
533	13.889	GEA3
534	13.889	GEA3
535	13.889	GEA3
536	13.889	GEA3
537	13.889	GEA3
538	13.889	GEA3
539	13.889	GEA3
540	13.889	GEA3

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
541	13.889	GEA3
542	13.889	GEA3
543	13.889	GEA3
544	13.889	GEA3
545	13.889	GEA3
546	13.368	GEA3
547	12.847	GEA3
548	12.326	GEA3
549	11.806	GEA3
550	11.285	GEA3
551	10.764	GEA3
552	10.243	GEA3
553	9.722	GEA3
554	9.722	GEA3
555	9.722	GEA3
556	9.722	GEA3
557	9.722	GEA3
558	9.722	GEA3
559	9.722	GEA3
560	9.722	GEA3
561	9.722	GEA3
562	9.722	GEA3
563	9.722	GEA3
564	9.722	GEA3
565	9.722	GEA3
566	9.722	GEA3
567	9.722	CHNG
568	9.722	CHNG
569	8.73	GEA2
570	7.738	GEA2

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
571	6.746	GEA2
572	5.754	GEA2
573	4.762	GEA2
574	3.77	GEA2
575	2.778	GEA2
576	1.852	CHNG
577	0.926	CHNG
578	0	CHNG
579	0	IDLE
580	0	IDLE
581	0	IDLE
582	0	IDLE
583	0	IDLE
584	0	IDLE
585	0	IDLE
586	0	IDLE
587	0	IDLE
588	0	IDLE
589	0	IDLE
590	0	IDLE
591	0	IDLE
592	0	IDLE
593	0	IDLE
594	0	IDLE
595	0	IDLE
596	0	IDLE
597	1.042	GEA1
598	2.083	GEA1
599	3.125	GEA1
600	4.167	GEA1

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
601	4.167	GEA1
602	4.167	GEA1
603	4.167	GEA1
604	4.167	GEA1
605	4.167	GEA1
606	4.167	GEA1
607	4.167	GEA1
608	4.167	GEA1
609	3.472	GEA1
610	2.778	GEA1
611	1.852	CHNG
612	0.926	CHNG
613	0	CHNG
614	0	IDLE
615	0	IDLE
616	0	IDLE
617	0	IDLE
618	0	IDLE
619	0	IDLE
620	0	IDLE
621	0	IDLE
622	0	IDLE
623	0	IDLE
624	0	IDLE
625	0	IDLE
626	0	IDLE
627	0	IDLE
628	0	IDLE
629	0	IDLE
630	0	IDLE

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
631	0	IDLE
632	0	IDLE
633	0	IDLE
634	0	IDLE
635	0.833	GEA1
636	1.667	GEA1
637	2.5	GEA1
638	3.333	GEA1
639	4.167	GEA1
640	4.167	CHNG
641	4.167	CHNG
642	5.111	GEA2
643	6.056	GEA2
644	7	GEA2
645	7.944	GEA2
646	8.889	GEA2
647	8.889	GEA2
648	8.889	GEA2
649	8.889	GEA2
650	8.889	GEA2
651	8.889	GEA2
652	8.889	GEA2
653	8.889	GEA2
654	8.889	GEA2
655	8.889	GEA2
656	8.889	GEA2
657	8.889	GEA2
658	8.889	GEA2
659	8.889	GEA2
660	8.889	GEA2

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
661	8.889	GEA2
662	8.889	GEA2
663	8.889	GEA2
664	8.889	GEA2
665	8.889	GEA2
666	8.889	GEA2
667	8.889	GEA2
668	8.889	GEA2
669	8.889	GEA2
670	8.889	GEA2
671	8.125	GEA2
672	7.361	GEA2
673	6.597	GEA2
674	5.833	GEA2
675	5.069	GEA2
676	4.306	GEA2
677	3.542	GEA2
678	2.778	GEA2
679	1.852	CHNG
680	0.926	CHNG
681	0	CHNG
682	0	IDLE
683	0	IDLE
684	0	IDLE
685	0	IDLE
686	0	IDLE
687	0	IDLE
688	0	IDLE
689	0	IDLE
690	0	IDLE

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
691	0	IDLE
692	0	IDLE
693	0	IDLE
694	0	IDLE
695	0	IDLE
696	0	IDLE
697	0	IDLE
698	0	IDLE
699	0	IDLE
700	0	IDLE
701	0	IDLE
702	0	IDLE
703	0.833	GEA1
704	1.667	GEA1
705	2.5	GEA1
706	3.333	GEA1
707	4.167	GEA1
708	4.167	CHNG
709	4.167	CHNG
710	4.784	GEA2
711	5.401	GEA2
712	6.019	GEA2
713	6.636	GEA2
714	7.253	GEA2
715	7.87	GEA2
716	8.488	GEA2
717	9.105	GEA2
718	9.722	GEA2
719	9.722	CHNG
720	9.722	CHNG

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
721	10.243	GEA3
722	10.764	GEA3
723	11.285	GEA3
724	11.806	GEA3
725	12.326	GEA3
726	12.847	GEA3
727	13.368	GEA3
728	13.889	GEA3
729	13.889	GEA3
730	13.889	GEA3
731	13.889	GEA3
732	13.889	GEA3
733	13.889	GEA3
734	13.889	GEA3
735	13.889	GEA3
736	13.889	GEA3
737	13.889	GEA3
738	13.889	GEA3
739	13.889	GEA3
740	13.889	GEA3
741	13.368	GEA3
742	12.847	GEA3
743	12.326	GEA3
744	11.806	GEA3
745	11.285	GEA3
746	10.764	GEA3
747	10.243	GEA3
748	9.722	GEA3
749	9.722	GEA3
750	9.722	GEA3

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
751	9.722	GEA3
752	9.722	GEA3
753	9.722	GEA3
754	9.722	GEA3
755	9.722	GEA3
756	9.722	GEA3
757	9.722	GEA3
758	9.722	GEA3
759	9.722	GEA3
760	9.722	GEA3
761	9.722	GEA3
762	9.722	CHNG
763	9.722	CHNG
764	8.73	GEA2
765	7.738	GEA2
766	6.746	GEA2
767	5.754	GEA2
768	4.762	GEA2
769	3.77	GEA2
770	2.778	GEA2
771	1.852	CHNG
772	0.926	CHNG
773	0	CHNG
774	0	IDLE
775	0	IDLE
776	0	IDLE
777	0	IDLE
778	0	IDLE
779	0	IDLE
780	0	IDLE

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
781	0	IDLE
782	0	IDLE
783	0	IDLE
784	0	IDLE
785	0	IDLE
786	0	IDLE
787	0	IDLE
788	0	IDLE
789	0	IDLE
790	0	IDLE
791	0	IDLE
792	0	IDLE
793	0	IDLE
794	0	IDLE
795	0	IDLE
796	0	IDLE
797	0	IDLE
798	0	IDLE
799	0	IDLE
800	0	IDLE
801	0.833	GEA1
802	1.667	GEA1
803	2.5	GEA1
804	3.333	GEA1
805	4.167	GEA1
806	4.167	CHNG
807	4.167	CHNG
808	4.784	GEA2
809	5.401	GEA2
810	6.019	GEA2

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
811	6.636	GEA2
812	7.253	GEA2
813	7.87	GEA2
814	8.488	GEA2
815	9.105	GEA2
816	9.722	GEA2
817	9.722	CHNG
818	9.722	CHNG
819	10.243	GEA3
820	10.764	GEA3
821	11.285	GEA3
822	11.806	GEA3
823	12.326	GEA3
824	12.847	GEA3
825	13.368	GEA3
826	13.889	GEA3
827	13.889	CHNG
828	13.889	CHNG
829	14.316	GEA4
830	14.744	GEA4
831	15.171	GEA4
832	15.598	GEA4
833	16.026	GEA4
834	16.453	GEA4
835	16.88	GEA4
836	17.308	GEA4
837	17.735	GEA4
838	18.162	GEA4
839	18.59	GEA4
840	19.017	GEA4

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
841	19.444	GEA4
842	19.444	GEA5
843	19.444	GEA5
844	19.444	GEA5
845	19.444	GEA5
846	19.444	GEA5
847	19.444	GEA5
848	19.444	GEA5
849	19.444	GEA5
850	19.444	GEA5
851	19.444	GEA5
852	19.444	GEA5
853	19.444	GEA5
854	19.444	GEA5
855	19.444	GEA5
856	19.444	GEA5
857	19.444	GEA5
858	19.444	GEA5
859	19.444	GEA5
860	19.444	GEA5
861	19.444	GEA5
862	19.444	GEA5
863	19.444	GEA5
864	19.444	GEA5
865	19.444	GEA5
866	19.444	GEA5
867	19.444	GEA5
868	19.444	GEA5
869	19.444	GEA5
870	19.444	GEA5

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
871	19.444	GEA5
872	19.444	GEA5
873	19.444	GEA5
874	19.444	GEA5
875	19.444	GEA5
876	19.444	GEA5
877	19.444	GEA5
878	19.444	GEA5
879	19.444	GEA5
880	19.444	GEA5
881	19.444	GEA5
882	19.444	GEA5
883	19.444	GEA5
884	19.444	GEA5
885	19.444	GEA5
886	19.444	GEA5
887	19.444	GEA5
888	19.444	GEA5
889	19.444	GEA5
890	19.444	GEA5
891	19.444	GEA5
892	18.75	GEA5
893	18.056	GEA5
894	17.361	GEA5
895	16.667	GEA5
896	15.972	GEA4
897	15.278	GEA4
898	14.583	GEA4
899	13.889	GEA4
900	13.889	GEA4

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
901	13.889	GEA4
902	13.889	GEA4
903	13.889	GEA4
904	13.889	GEA4
905	13.889	GEA4
906	13.889	GEA4
907	13.889	GEA4
908	13.889	GEA4
909	13.889	GEA4
910	13.889	GEA4
911	13.889	GEA4
912	13.889	GEA4
913	13.889	GEA4
914	13.889	GEA4
915	13.889	GEA4
916	13.889	GEA4
917	13.889	GEA4
918	13.889	GEA4
919	13.889	GEA4
920	13.889	GEA4
921	13.889	GEA4
922	13.889	GEA4
923	13.889	GEA4
924	13.889	GEA4
925	13.889	GEA4
926	13.889	GEA4
927	13.889	GEA4
928	13.889	GEA4
929	13.889	GEA4
930	13.889	GEA4

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
931	13.889	GEA4
932	13.889	GEA4
933	13.889	GEA4
934	13.889	GEA4
935	13.889	GEA4
936	13.889	GEA4
937	13.889	GEA4
938	13.889	GEA4
939	13.889	GEA4
940	13.889	GEA4
941	13.889	GEA4
942	13.889	GEA4
943	13.889	GEA4
944	13.889	GEA4
945	13.889	GEA4
946	13.889	GEA4
947	13.889	GEA4
948	13.889	GEA4
949	13.889	GEA4
950	13.889	GEA4
951	13.889	GEA4
952	13.889	GEA4
953	13.889	GEA4
954	13.889	GEA4
955	13.889	GEA4
956	13.889	GEA4
957	13.889	GEA4
958	13.889	GEA4
959	13.889	GEA4
960	13.889	GEA4

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
961	13.889	GEA4
962	13.889	GEA4
963	13.889	GEA4
964	13.889	GEA4
965	13.889	GEA4
966	13.889	GEA4
967	13.889	GEA4
968	13.889	GEA4
969	14.316	GEA4
970	14.744	GEA4
971	15.171	GEA4
972	15.598	GEA4
973	16.026	GEA4
974	16.453	GEA4
975	16.88	GEA4
976	17.308	GEA4
977	17.735	GEA4
978	18.162	GEA4
979	18.59	GEA4
980	19.017	GEA4
981	19.444	GEA4
982	19.444	GEA5
983	19.444	GEA5
984	19.444	GEA5
985	19.444	GEA5
986	19.444	GEA5
987	19.444	GEA5
988	19.444	GEA5
989	19.444	GEA5
990	19.444	GEA5

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
991	19.444	GEA5
992	19.444	GEA5
993	19.444	GEA5
994	19.444	GEA5
995	19.444	GEA5
996	19.444	GEA5
997	19.444	GEA5
998	19.444	GEA5
999	19.444	GEA5
1000	19.444	GEA5
1001	19.444	GEA5
1002	19.444	GEA5
1003	19.444	GEA5
1004	19.444	GEA5
1005	19.444	GEA5
1006	19.444	GEA5
1007	19.444	GEA5
1008	19.444	GEA5
1009	19.444	GEA5
1010	19.444	GEA5
1011	19.444	GEA5
1012	19.444	GEA5
1013	19.444	GEA5
1014	19.444	GEA5
1015	19.444	GEA5
1016	19.444	GEA5
1017	19.444	GEA5
1018	19.444	GEA5
1019	19.444	GEA5
1020	19.444	GEA5

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
1021	19.444	GEA5
1022	19.444	GEA5
1023	19.444	GEA5
1024	19.444	GEA5
1025	19.444	GEA5
1026	19.444	GEA5
1027	19.444	GEA5
1028	19.444	GEA5
1029	19.444	GEA5
1030	19.444	GEA5
1031	19.444	GEA5
1032	19.683	GEA5
1033	19.921	GEA5
1034	20.159	GEA5
1035	20.397	GEA5
1036	20.635	GEA5
1037	20.873	GEA5
1038	21.111	GEA5
1039	21.349	GEA5
1040	21.587	GEA5
1041	21.825	GEA5
1042	22.063	GEA5
1043	22.302	GEA5
1044	22.54	GEA5
1045	22.778	GEA5
1046	23.016	GEA5
1047	23.254	GEA5
1048	23.492	GEA5
1049	23.73	GEA5
1050	23.968	GEA5

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
1051	24.206	GEA5
1052	24.444	GEA5
1053	24.683	GEA5
1054	24.921	GEA5
1055	25.159	GEA5
1056	25.397	GEA5
1057	25.635	GEA5
1058	25.873	GEA5
1059	26.111	GEA5
1060	26.349	GEA5
1061	26.587	GEA5
1062	26.825	GEA5
1063	27.063	GEA5
1064	27.302	GEA5
1065	27.54	GEA5
1066	27.778	GEA5
1067	27.778	GEA5
1068	27.778	GEA5
1069	27.778	GEA5
1070	27.778	GEA5
1071	27.778	GEA5
1072	27.778	GEA5
1073	27.778	GEA5
1074	27.778	GEA5
1075	27.778	GEA5
1076	27.778	GEA5
1077	27.778	GEA5
1078	27.778	GEA5
1079	27.778	GEA5
1080	27.778	GEA5

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
1081	27.778	GEA5
1082	27.778	GEA5
1083	27.778	GEA5
1084	27.778	GEA5
1085	27.778	GEA5
1086	27.778	GEA5
1087	27.778	GEA5
1088	27.778	GEA5
1089	27.778	GEA5
1090	27.778	GEA5
1091	27.778	GEA5
1092	27.778	GEA5
1093	27.778	GEA5
1094	27.778	GEA5
1095	27.778	GEA5
1096	27.778	GEA5
1097	28.056	GEA5
1098	28.333	GEA5
1099	28.611	GEA5
1100	28.889	GEA5
1101	29.167	GEA5
1102	29.444	GEA5
1103	29.722	GEA5
1104	30	GEA5
1105	30.278	GEA5
1106	30.556	GEA5
1107	30.833	GEA5
1108	31.111	GEA5
1109	31.389	GEA5
1110	31.667	GEA5

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
1111	31.944	GEA5
1112	32.222	GEA5
1113	32.5	GEA5
1114	32.778	GEA5
1115	33.056	GEA5
1116	33.333	GEA5
1117	33.333	GEA5
1118	33.333	GEA5
1119	33.333	GEA5
1120	33.333	GEA5
1121	33.333	GEA5
1122	33.333	GEA5
1123	33.333	GEA5
1124	33.333	GEA5
1125	33.333	GEA5
1126	33.333	GEA5
1127	32.639	GEA5
1128	31.944	GEA5
1129	31.25	GEA5
1130	30.556	GEA5
1131	29.861	GEA5
1132	29.167	GEA5
1133	28.472	GEA5
1134	27.778	GEA5
1135	27.083	GEA5
1136	26.389	GEA5
1137	25.694	GEA5
1138	25	GEA5
1139	24.306	GEA5
1140	23.611	GEA5

ตารางที่ ก (ต่อ) แสดงรูปแบบการขับขี่ที่ป้อนแก่โปรแกรมแบบจำลอง ตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม มอก. 1280-2538

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
1141	22.917	GEA5
1142	22.222	GEA5
1143	21.181	GEA5
1144	20.139	GEA5
1145	19.097	GEA5
1146	18.056	GEA5
1147	17.014	GEA5
1148	15.972	GEA5
1149	14.931	GEA5
1150	13.889	GEA5
1151	12.5	IDLE
1152	11.111	IDLE
1153	9.722	IDLE
1154	8.333	IDLE
1155	6.944	IDLE
1156	5.556	IDLE
1157	4.167	IDLE
1158	2.778	IDLE
1159	1.389	IDLE
1160	0	IDLE

TIME(SEC)	VELOCITY (M/S)	GEAR POSITION
1161	0	IDLE
1162	0	IDLE
1163	0	IDLE
1164	0	IDLE
1165	0	IDLE
1166	0	IDLE
1167	0	IDLE
1168	0	IDLE
1169	0	IDLE
1170	0	IDLE
1171	0	IDLE
1172	0	IDLE
1173	0	IDLE
1174	0	IDLE
1175	0	IDLE
1176	0	IDLE
1177	0	IDLE
1178	0	IDLE
1179	0	IDLE
1180	0	IDLE
1181	0	IDLE

ภาคผนวก ข

ข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บน Engine Dynamometer

ตารางที่ ข1 แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนเอนจินไดนาโมมิเตอร์

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: ESSO Supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION			
Engine Speed: RPM.	Mea. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressure :inHg.(Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1): l	Inlet air (2): l	Inlet air (3): l	Air Measurement Time: sec	NOx:ppm.dry	CO:%dry	CO2:%dry	HC:ppm.dry
750	4	3	20.250	30	28	10	49.79	49.52	49.45	49.59	28.00	29.00	30.00	30.00	20.00	0	0.004	15.71	19
750	27	5	15.500	30	28	10	29.54	29.63	29.55	29.57	28.00	27.00	27.00	27.00	20.00	0	0.097	15.55	125
750	40	7	12.500	31	29	10	24.09	23.94	23.87	23.97	28.00	53.00	49.00	51.00	20.00	0	0.045	15.78	88
750	52	10	9.500	31	29	10	20.01	20.19	20.28	20.16	28.00	69.00	70.00	69.00	20.00	0	0.058	15.77	54
750	63	12	6.500	31	29	10	17.15	17.05	17.11	17.10	28.00	77.00	75.00	76.00	20.00	0	0.098	15.84	43
750	76	17	3.500	32	29	10	14.77	14.80	14.76	14.78	28.50	90.00	86.00	85.00	20.00	0	0.102	15.82	25
750	89	100	0.000	32	29	10	10.93	10.77	10.95	10.88	28.50	77.00	78.00	77.00	20.00	0	4.736	12.70	214
1000	7	4	20.250	32	30	10	36.08	35.97	35.30	35.78	28.50	42.00	40.00	43.00	20.00	0	0.059	15.80	83
1000	16	6	18.500	32	30	10	28.06	28.17	28.15	28.13	29.00	61.00	66.00	66.00	20.00	0	0.080	15.80	91
1000	30	9	15.500	32	30	10	21.74	21.69	21.83	21.75	29.00	76.00	78.00	74.00	20.00	0	0.092	15.83	86
1000	42	10	12.500	32	30	10	17.68	17.78	17.68	17.71	29.50	85.00	79.00	85.00	20.00	0	0.122	15.82	75
1000	56	13	9.500	32	30	10	14.56	14.40	14.47	14.48	29.50	100.00	98.00	96.00	20.00	0	0.157	15.77	53
1000	69	16	6.500	32	30	10	12.56	12.49	12.42	12.49	29.50	117.00	121.00	119.00	20.00	0	0.182	15.69	14
1000	81	21	3.500	33	30	10	10.24	10.88	10.29	10.47	29.50	144.00	154.00	151.00	20.00	0	0.184	15.66	4
1000	95	100	0.820	33	31	25	20.14	20.17	20.13	20.15	29.50	104.00	104.00	105.00	20.00	0	5.025	12.57	212

ตารางที่ ข1 (ต่อ) แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนเอนจินไดนาโมมิเตอร์

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: ESSO Supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION			
Engine Speed: RPM.	Mea. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressue :inHg.(Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1): l	Inlet air (2): l	Inlet air (3): l	Air Measurement Time: sec	NOx:ppm.dry	CO:%dry	CO2:%dry	HC:ppmdry
1200	4	5	20.000	33	30	10	32.38	32.44	32.57	32.46	29.50	59.00	71.00	63.00	20.00	0	0.118	15.83	77
1200	15	8	18.500	32	30	10	23.98	24.21	23.96	24.05	29.50	69.00	69.00	69.00	20.00	0	0.134	15.86	84
1200	29	10	15.500	32	30	10	17.78	17.99	17.82	17.86	29.50	78.00	82.00	83.00	20.00	0	0.162	15.82	62
1200	43	12	12.500	32	30	10	14.47	14.86	14.69	14.67	29.50	103.00	98.00	96.00	20.00	0	0.205	15.74	58
1200	58	15	9.500	32	30	10	12.12	12.03	12.15	12.10	29.50	123.00	127.00	125.00	20.00	0	0.212	15.75	40
1200	70	18	6.500	32	30	10	10.29	10.29	10.49	10.36	29.50	161.00	160.00	154.00	20.00	0	0.266	15.71	23
1200	81	23	3.500	33	31	25	22.75	22.86	22.80	22.80	29.50	191.00	187.00	189.00	20.00	0	0.267	15.68	18
1200	100	100	0.000	33	30	25	16.81	16.84	16.86	16.84	29.50	120.00	121.00	120.00	20.00	0	4.790	12.65	215
1500	5	6	20.000	30	28	10	25.41	25.32	25.20	25.31	28.00	90.00	90.00	96.00	20.00	0	0.139	15.80	56
1500	18	10	18.500	30	28	10	18.70	18.93	18.65	18.76	28.00	81.00	81.00	80.00	20.00	0	0.148	15.77	51
1500	34	13	15.500	30	28	10	14.20	14.25	14.25	14.23	28.00	99.00	93.00	97.00	20.00	0	0.198	15.71	44
1500	52	15	12.500	31	29	10	11.44	11.32	11.37	11.38	29.00	143.00	139.00	136.00	20.00	0	0.242	15.69	42
1500	66	18	9.500	31	29	25	23.52	23.66	23.56	23.58	29.00	173.00	171.00	179.00	20.00	0	0.237	15.71	30
1500	74	21	6.500	32	30	25	20.46	20.43	20.34	20.41	30.00	207.00	211.00	214.00	20.00	0	0.243	15.66	24
1500	84	27	3.500	33	30	25	17.75	17.71	17.71	17.72	30.00	249.00	254.00	255.00	20.00	0	0.240	15.65	21
1500	104	100	0.000	33	31	25	13.12	13.00	13.08	13.07	31.00	155.00	154.00	154.00	20.00	0	5.084	12.42	199

ตารางที่ ข1 (ต่อ) แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนเอนจินไดนาโมมิเตอร์

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: ESSO Supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION			
Engine Speed: RPM.	Mea. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressue :inHg.(Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1): l	Inlet air (2): l	Inlet air (3): l	Air Measurement Time: sec	NOx:ppm dry	CO:%dry	CO2:%dry	HC:ppmdry
1800	4	10	20.000	33	30	10	19.92	19.79	19.98	19.90	28.50	85.00	85.00	84.00	20.00	0	0.177	15.78	31
1800	17	12	18.500	33	30	10	15.14	15.33	15.18	15.22	28.50	87.00	88.00	89.00	20.00	0	0.196	15.75	29
1800	32	16	15.500	33	30	10	11.31	11.15	11.14	11.20	28.50	158.00	156.00	159.00	20.00	0	0.230	15.72	21
1800	47	18	12.500	33	30	25	22.79	22.91	22.78	22.83	29.00	182.00	181.00	182.00	20.00	0	0.260	15.68	29
1800	63	21	9.500	33	30	25	19.16	19.06	19.11	19.11	29.00	221.00	220.00	220.00	20.00	0	0.235	15.69	24
1800	80	25	6.500	33	31	25	16.20	16.25	16.22	16.22	29.00	265.00	266.00	267.00	20.00	0	0.207	15.68	21
1800	94	31	3.500	34	31	25	14.15	14.13	14.17	14.15	29.00	198.00	196.00	198.00	20.00	0	0.206	15.67	19
1800	112	100	0.000	35	32	25	10.67	10.66	10.67	10.67	29.00	190.00	191.00	189.00	20.00	0	3.836	13.28	156
2100	5	11	20.000	34	32	10	17.21	16.90	17.15	17.09	29.50	91.00	90.00	90.00	20.00	0	0.229	15.71	20
2100	13	13	18.500	34	31	10	13.97	14.01	14.06	14.01	29.50	99.00	103.00	103.00	20.00	0	0.256	15.60	19
2100	28	16	15.500	33	31	10	10.55	10.52	10.59	10.55	29.50	157.00	158.00	157.00	20.00	0	0.240	15.62	16
2100	44	20	12.500	34	31	25	20.73	20.76	20.82	20.77	29.50	29.00	209.00	211.00	20.00	0	0.281	15.60	29
2100	58	23	9.500	34	31	25	17.18	17.26	17.26	17.23	29.50	261.00	259.00	261.00	20.00	0	0.270	15.69	24
2100	75	26	6.500	34	31	25	14.55	14.52	14.44	14.50	29.50	310.00	310.00	310.00	20.00	0	0.268	15.65	22
2100	89	33	3.500	34	31	25	12.63	12.63	12.66	12.64	29.50	351.00	343.00	256.00	20.00	0	0.271	15.64	20
2100	107	100	0.000	35	32	50	18.26	18.27	18.28	18.27	29.50	228.00	231.00	230.00	20.00	0	5.472	12.18	190

ตารางที่ ข1 (ต่อ) แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนเอนจินไดนาโมมิเตอร์

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: ESSO Supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION			
Engine Speed: RPM.	Mea. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressue :inHg.(Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1):l	Inlet air (2):l	Inlet air (3):l	Air Measurement Time: sec	NOx:ppm.dry	CO:%dry	CO2:%dry	HC:ppmdry
2500	6	14	20.000	35	32	10	13.60	13.75	13.70	13.68	29.50	114.00	112.00	109.00	20.00	0	0.296	15.65	19
2500	17	16	18.500	34	31	10	10.95	10.96	10.96	10.96	29.50	156.00	153.00	151.00	20.00	0	0.279	15.65	17
2500	33	20	15.500	33	31	25	20.17	20.09	20.08	20.11	29.50	222.00	222.00	223.00	20.00	0	0.197	15.73	19
2500	49	23	12.500	34	31	25	15.99	16.02	16.04	16.02	29.50	288.00	283.00	288.00	20.00	0	0.196	15.73	18
2500	66	26	9.500	34	31	25	13.36	13.36	13.31	13.34	30.00	344.00	348.00	348.00	20.00	0	0.186	15.75	18
2500	81	30	6.500	35	32	25	11.42	11.52	11.45	11.46	30.00	408.00	408.00	410.00	20.00	0	0.170	15.76	15
2500	96	37	3.500	35	32	50	19.89	19.94	19.95	19.93	30.00	461.00	461.00	457.00	20.00	0	0.198	15.74	13
2500	125	100	0.000	37	34	50	14.70	14.70	14.70	14.70	30.50	273.00	272.00	273.00	20.00	0	3.311	13.69	80
3000	8	14	20.000	35	32	10	11.35	11.36	11.35	11.35	30.00	133.00	134.00	132.00	20.00	0	0.239	15.71	15
3000	18	17	18.500	35	32	25	22.85	22.85	22.77	22.82	30.00	173.00	181.00	183.00	20.00	0	0.200	15.73	13
3000	34	21	15.500	34	31	25	16.75	16.78	16.73	16.75	30.00	262.00	271.00	267.00	20.00	0	0.187	15.67	19
3000	51	24	12.500	35	32	25	13.35	13.36	13.38	13.36	30.00	347.00	341.00	344.00	20.00	0	0.166	15.69	14
3000	68	28	9.500	36	33	25	11.05	11.05	11.10	11.07	30.50	424.00	423.00	420.00	20.00	0	0.169	15.73	12
3000	85	33	6.500	36	32	50	18.78	18.73	18.23	18.58	30.50	496.00	491.00	497.00	20.00	0	0.175	15.71	8
3000	101	41	3.500	37	33	50	16.25	16.23	16.21	16.23	31.00	564.00	561.00	554.00	20.00	0	0.192	15.69	15

ตารางที่ ข1 (ต่อ) แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนแอนจินไดนาโมมิเตอร์

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: ESSO Supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION			
Engine Speed: RPM.	Mea. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressue :inHg (Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1): l	Inlet air (2): l	Inlet air (3): l	Air Measurement Time: sec	NOx:ppm.dry	CO:%dry	CO2:%dry	HC:ppmdry
3500	8	16	20.000	36	33	25	24.21	23.96	24.06	24.08	30.50	165.00	174.00	176.00	20.00	0	0.238	15.62	13
3500	16	19	18.500	35	32	25	19.84	19.94	20.00	19.93	30.50	212.00	215.00	212.00	20.00	0	0.264	15.64	15
3500	31	23	15.500	35	32	25	14.73	14.81	14.79	14.78	31.50	312.00	305.00	314.00	20.00	0	0.216	15.66	15
3500	48	26	12.500	35	32	25	11.73	11.67	11.67	11.69	31.50	391.00	395.00	401.00	20.00	0	0.181	15.70	19
3500	65	30	9.500	36	33	50	19.16	19.24	19.16	19.19	31.50	463.00	484.00	482.00	20.00	0	0.154	15.71	14
3500	82	36	6.500	37	33	50	16.31	16.34	16.35	16.33	31.50	537.00	544.00	534.00	20.00	0	0.148	15.76	9
3500	98	44	3.500	37	34	50	14.17	14.13	14.18	14.16	32.00	460.00	442.00	438.00	20.00	0	0.147	15.74	5
4000	10	19	19.500	31	28	25	18.87	18.76	18.86	18.83	28.00	234.00	232.00	235.00	20.00	0	0.253	15.61	7
4000	16	21	18.500	34	31	25	16.46	16.52	16.61	16.53	28.00	279.00	277.00	280.00	20.00	0	0.237	15.66	5
4000	32	25	15.500	34	31	25	12.51	12.46	12.49	12.49	28.00	377.00	377.00	377.00	20.00	0	0.146	15.72	1
4000	47	29	12.500	34	31	25	10.01	10.03	10.04	10.03	28.00	479.00	477.00	478.00	20.00	0	0.113	15.74	1
4000	65	33	9.500	36	33	50	16.56	16.56	16.57	16.56	28.50	580.00	578.00	577.00	20.00	0	0.141	15.72	10
4000	81	38	6.500	38	34	50	14.18	14.20	14.22	14.20	28.50	675.00	674.00	676.00	20.00	0	0.124	15.74	8
4000	100	47	3.500	37	34	50	11.53	11.51	11.51	11.52	29.50	748.00	751.00	753.00	20.00	0	1.645	14.78	29

ตารางที่ ข2 แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนเอนจินไดนาโมมิเตอร์

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION				
Engine Speed: RPM.	Meas. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressue :inHg.(Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1):1	Inlet air (2):1	Inlet air (3):1	Air Measurement Time: sec	NOx:ppm.dry	CO:%dry	CO2:%dry	HC:ppm.dry	Exhaust Temperature (C)
750	6	3	20.250	27	25	10	49.83	49.76	49.66	49.75	27.00	30.00	29.00	31.00	20.00	0	0.009	16.04	26	292
750	11	3	20.250	28	26	10	40.45	39.52	40.48	40.15	27.00	25.00	25.00	25.00	20.00	0	0.004	16.04	10	305
750	29	5	15.500	28	26	10	27.95	28.16	28.38	28.16	26.50	65.00	68.00	67.00	20.00	0	0.036	16.00	73	329
750	43	7	12.500	28	26	10	24.36	23.93	23.82	24.04	26.50	62.00	63.00	65.00	20.00	0	0.042	15.98	63	363
750	56	10	9.500	29	26	10	19.90	19.89	19.91	19.90	26.50	70.00	68.00	69.00	20.00	0	0.059	15.98	23	390
750	69	12	6.500	29	27	10	17.22	16.91	16.90	17.01	26.50	80.00	81.00	78.00	20.00	0	0.055	15.98	6	447
750	79	17	3.500	30	27	10	14.48	14.69	14.70	14.62	26.50	88.00	85.00	87.00	20.00	0	0.082	15.96	0	496
750	91	100	0.000	30	28	10	10.94	10.97	10.83	10.91	26.50	87.00	86.00	85.00	20.00	0	4.520	12.96	151	519
1000	9	4	20.250	29	27	10	35.95	36.41	37.29	36.55	27.50	46.00	46.00	52.00	20.00	0	0.039	15.94	42	344
1000	18	6	18.500	29	27	10	28.43	29.11	27.89	28.48	27.50	59.00	61.00	61.00	20.00	0	0.038	19.95	32	364
1000	33	9	15.500	29	27	10	21.59	22.02	22.02	21.88	27.50	68.00	68.00	69.00	20.00	0	0.070	15.92	27	397
1000	45	11	12.500	29	27	10	17.91	18.15	17.64	17.90	27.50	85.00	84.00	86.00	20.00	0	0.086	15.92	16	430
1000	59	13	9.500	30	27	10	14.49	14.75	14.36	14.53	27.50	102.00	101.00	95.00	20.00	0	0.120	15.88	0	462
1000	71	16	6.500	30	27	10	12.36	12.61	12.16	12.38	27.50	124.00	112.00	119.00	20.00	0	0.146	15.88	0	517
1000	82	21	3.500	30	28	10	10.88	10.91	10.85	10.88	27.50	156.00	154.00	153.00	20.00	0	0.153	15.85	0	578
1000	99	100	0.820	31	28	25	19.8	19.96	19.82	19.86	27.50	105.00	108.00	108.00	20.00	0	5.024	12.55	158	579

ตารางที่ ข2 (ต่อ) แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนเอนจินไดนาโมมิเตอร์

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION				
Engine Speed: RPM.	Mea. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressue :inHg.(Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1): l	Inlet air (2): l	Inlet air (3): l	Air Measurement Time: sec	NOx:ppm.dry	CO:%dry	CO2:%dry	HC:ppmdry	Exhaust Temperature (C)
1200	5	4	20.000	28	26	10	32.55	33.01	32.49	32.68	26.50	69.00	67.00	64.00	20.00	0	0.083	16.03	58	377
1200	19	7	18.500	29	27	10	22.65	23.15	22.92	22.91	26.50	70.00	69.00	69.00	20.00	0	0.110	16.01	48	408
1200	32	10	15.500	30	28	10	17.67	17.81	17.88	17.79	27.00	81.00	82.00	86.00	20.00	0	0.143	15.98	36	444
1200	46	12	12.500	31	28	10	14.46	14.18	14.72	14.45	27.00	97.00	102.00	91.00	20.00	0	0.161	15.98	24	474
1200	61	15	9.500	31	28	10	12.25	12.12	12.15	12.17	27.00	119.00	120.00	129.00	20.00	0	0.174	15.96	9	503
1200	74	19	6.500	31	28	10	10.1	10.06	10.12	10.09	27.50	158.00	157.00	164.00	20.00	0	0.208	15.93	1	565
1200	86	24	3.500	30	28	25	22.07	22.07	22.04	22.06	27.50	189.00	188.00	189.00	20.00	0	0.222	15.88	0	616
1200	106	100	0.000	31	28	25	16.54	16.47	16.58	16.53	27.50	122.00	122.00	120.00	20.00	0	4.667	12.88	149	609
1500	5	6	20.000	31	28	10	25.9	25.61	25.57	25.69	27.50	80.00	74.00	74.00	20.00	0	0.127	15.99	28	432
1500	18	10	18.500	31	28	10	19.05	18.75	18.84	18.88	27.50	74.00	85.00	85.00	20.00	0	0.133	16.02	30	458
1500	32	13	15.500	31	29	10	14.35	14.35	14.15	14.28	27.50	96.00	93.00	100.00	20.00	0	0.210	16.02	38	488
1500	47	15	12.500	31	29	10	11.57	11.61	11.43	11.54	28.00	134.00	136.00	124.00	20.00	0	0.225	16.00	28	522
1500	62	18	9.500	31	29	25	23.45	23.42	23.43	23.43	28.00	171.00	178.00	165.00	20.00	0	0.213	16.02	22	551
1500	77	22	6.500	32	29	25	20.13	20.07	20.08	20.09	28.00	215.00	215.00	213.00	20.00	0	0.224	16.00	15	604
1500	90	27	3.500	33	30	25	17.61	17.62	17.59	17.61	28.00	246.00	247.00	249.00	20.00	0	0.195	15.99	9	661
1500	108	100	0.000	33	30	25	12.95	12.94	13.01	12.97	28.50	154.00	157.00	157.00	20.00	0	4.879	12.80	154	662

ตารางที่ ข2 (ต่อ) แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนเอนจินไดนาโมมิเตอร์

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION				
Engine Speed: RPM.	Mea. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressue :inHg.(Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1):l	Inlet air (2):l	Inlet air (3):l	Air Measurement Time: sec	NOx:ppm.dry	CO:%dry	CO2:%dry	HC:ppmdry	Exhaust Temperature (C)
1800	6	9	20.000	32	29	10	20.22	19.72	20.26	20.07	28.50	78.00	74.00	75.00	20.00	0	0.174	15.98	35	491
1800	19	12	18.500	32	29	10	14.96	14.59	14.82	14.79	28.50	103.00	103.00	102.00	20.00	0	0.193	15.96	31	515
1800	33	15	15.500	32	29	10	11.56	11.39	11.51	11.49	28.00	147.00	148.00	144.00	20.00	0	0.238	15.91	25	559
1800	49	18	12.500	32	28	25	22.84	22.94	22.84	22.87	28.00	185.00	179.00	181.00	20.00	0	0.221	15.87	10	591
1800	65	21	9.500	31	28	25	18.86	18.86	18.74	18.82	28.00	237.00	233.00	238.00	20.00	0	0.193	15.89	5	616
1800	82	25	6.500	31	28	25	15.95	15.99	16.04	15.99	28.00	274.00	270.00	273.00	20.00	0	0.189	15.87	6	658
1800	96	31	3.500	31	28	25	13.99	13.94	13.98	13.97	28.50	207.00	203.00	203.00	20.00	0	0.182	15.87	2	700
1800	117	100	0.000	32	29	25	10.31	10.25	10.29	10.28	28.00	194.00	192.00	194.00	20.00	0	4.176	13.28	160	700
2100	5	11	20.000	28	26	10	17.74	17.43	17.25	17.47	27.00	90.00	88.00	87.00	20.00	0	0.219	15.90	20	523
2100	16	13	18.500	29	26	10	13.39	13.44	13.41	13.41	27.00	98.00	102.00	103.00	20.00	0	0.215	15.89	16	544
2100	31	16	15.500	29	26	10	10.31	10.16	10.22	10.23	27.00	153.00	153.00	153.00	20.00	0	0.233	15.85	17	591
2100	46	19	12.500	28	26	25	20.14	20.14	20.09	20.12	27.00	217.00	217.00	215.00	20.00	0	0.233	15.85	12	624
2100	62	23	9.500	29	26	25	16.64	16.69	16.61	16.65	27.00	264.00	261.00	264.00	20.00	0	0.248	15.83	9	650
2100	77	26	6.500	30	27	25	14.23	14.23	14.31	14.26	27.00	311.00	308.00	315.00	20.00	0	0.254	15.83	5	678
2100	93	33	3.500	30	27	25	12.29	12.34	12.36	12.33	27.00	365.00	358.00	356.00	20.00	0	0.262	15.82	4	720
2100	112	100	0.000	32	29	50	17.71	12.66	17.66	16.01	28.00	227.00	226.00	228.00	20.00	0	5.736	12.29	205	693

ตารางที่ ข2 (ต่อ) แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนเอนจินไดนาโมมิเตอร์

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION				
Engine Speed: RPM.	Mea. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressue :inHg.(Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1): l	Inlet air (2): l	Inlet air (3): l	Air Measurement Time: sec	NOx:ppm.dry	CO:%dry	CO2:%dry	HC:ppmdry	Exhaust Temperature (C)
2500	7	13	20.000	30	27	10	13.5	13.67	13.58	13.58	27.50	119.00	116.00	118.00	20.00	0	0.287	15.80	2	578
2500	18	16	18.500	30	27	10	10.66	10.55	10.77	10.66	27.50	163.00	151.00	158.00	20.00	0	0.248	15.84	2	596
2500	35	20	15.500	30	27	25	19.6	19.54	19.67	19.60	27.50	222.00	225.00	223.00	20.00	0	0.185	15.88	1	645
2500	52	23	12.500	31	28	25	15.61	15.67	15.73	15.67	27.50	290.00	287.00	289.00	20.00	0	0.171	15.91	1	667
2500	68	26	9.500	31	28	25	13.09	13.05	13.06	13.07	28.00	353.00	357.00	354.00	20.00	0	0.155	15.92	1	699
2500	85	30	6.500	31	28	25	11.26	11.25	11.24	11.25	28.00	414.00	411.00	411.00	20.00	0	0.153	15.93	0	730
2500	99	37	3.500	32	28	50	19.56	19.59	19.59	19.58	28.00	460.00	456.00	462.00	20.00	0	0.184	15.89	0	765
2500	123	100	0.000	32	29	50	14.63	14.62	14.63	14.63	28.50	273.00	271.00	270.00	20.00	0	3.365	13.86	109	775
3000	8	14	20.000	31	28	10	11.37	11.42	11.25	11.35	28.50	147.00	149.00	145.00	20.00	0	0.276	15.82	8	597
3000	16	17	18.500	31	28	25	23.13	23.22	23.23	23.19	28.50	183.00	186.00	188.00	20.00	0	0.234	15.86	4	611
3000	34	21	15.500	31	28	25	16.86	16.8	16.84	16.83	28.50	270.00	268.00	268.00	20.00	0	0.176	15.88	1	663
3000	50	25	12.500	32	29	25	13.49	13.41	13.45	13.45	28.50	349.00	343.00	335.00	20.00	0	0.153	15.72	0	689
3000	62	28	9.500	32	28	25	11.03	11.05	11.04	11.04	28.50	419.00	419.00	424.00	20.00	0	0.136	15.93	1	724
3000	84	33	6.500	33	29	50	18.79	18.75	18.79	18.78	29.00	494.00	497.00	495.00	20.00	0	0.148	15.92	0	767
3000	100	41	3.500	33	29	50	16.28	16.27	16.28	16.28	29.00	557.00	557.00	564.00	20.00	0	0.159	15.92	0	800
3000	126	100	0.000	33	29	50	11.85	11.84	11.87	11.85	28.50	334.00	336.00	335.00	20.00	0	5.065	12.75	116	775

ตารางที่ ข2 (ต่อ) แสดงข้อมูลดิบของการทดสอบเครื่องยนต์ 4A-FE บนเอนจินไดนาโมมิเตอร์

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

						FUEL MEASUREMENT						AIR MEASUREMENT				EMISSION				
Engine Speed: RPM.	Mea. Engine Torque:Nm.	Throttle Opening (%)	Gauge Manifold Pressue :inHg.(Vacuum)	Amb. Temperature Dry Bulb:C	Amb. Temperature Wet Bulb:C	Quantity of Fuel:cc.	Time(1):s	Time(2):s	Time(3):s	Time(avg):s	Fuel Temperature:C	Inlet air (1): l	Inlet air (2): l	Inlet air (3): l	Air Measurement Time: sec	NOx:ppm.dry	CO:%dry	CO2:%dry	HC:ppmdry	Exhaust Temperature (C)
3500	8	17	20.000	28	26	25	23.54	23.4	23.28	23.41	25.00	184.00	185.00	184.00	20.00	0	0.253	15.89	12	661
3500	16	19	18.500	29	27	25	19.5	19.47	19.44	19.47	25.50	230.00	231.00	236.00	20.00	0	0.282	15.87	11	673
3500	32	23	15.500	29	27	25	14.57	14.51	14.54	14.54	26.00	321.00	324.00	323.00	20.00	0	0.188	15.95	7	714
3500	48	27	12.500	30	27	25	11.52	11.49	11.46	11.49	26.50	389.00	394.00	395.00	20.00	0	0.156	15.59	4	736
3500	66	31	9.500	29	27	50	18.85	18.87	18.91	18.88	26.50	487.00	488.00	484.00	20.00	0	0.143	15.99	1	767
3500	83	36	6.500	31	28	50	16.12	16.11	16.12	16.12	27.00	546.00	545.00	547.00	20.00	0	0.152	16.00	4	799
3500	99	44	3.500	31	29	50	14.01	14.03	14.02	14.02	27.00	478.00	475.00	475.00	20.00	0	0.134	16.02	0	824
3500	124	100	0.000	33	30	50	10.53	10.52	10.52	10.52	28.00	392.00	396.00	396.00	20.00	0	4.071	13.41	73	792
4000	10	19	19.500	31	29	25	19.12	18.97	19.01	19.03	27.00	226.00	237.00	234.00	20.00	0	0.244	15.92	1	690
4000	16	21	18.500	31	28	25	16.47	16.52	16.47	16.49	27.00	279.00	273.00	274.00	20.00	0	0.236	15.93	1	717
4000	32	25	15.500	31	28	25	12.36	12.33	12.42	12.37	27.00	386.00	376.00	380.00	20.00	0	0.148	15.99	1	746
4000	49	29	12.500	32	29	50	19.59	19.6	19.58	19.59	27.50	475.00	478.00	476.00	20.00	0	0.126	16.01	0	784
4000	65	33	9.500	32	29	50	16.39	16.38	16.37	16.38	27.50	571.00	574.00	574.00	20.00	0	0.119	15.99	0	798
4000	83	39	6.500	33	29	50	13.93	13.93	13.97	13.94	27.50	673.00	667.00	672.00	20.00	0	0.098	16.00	1	816
4000	102	47	3.500	33	30	50	11.52	11.52	11.55	11.53	27.50	756.00	762.00	750.00	20.00	0	1.457	15.09	19	826
4000	121	100	0.000	34	30	100	18.26	18.26	18.24	18.25	28.00	574.00	564.00	568.00	20.00	0	4.598	13.15	58	796

ภาคผนวก ค

ข้อมูลของการทดสอบเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

ตารางที่ ก1 แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: ESSO Supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc./s.	Std. Fuel Flow Rate:cc./s.	Air Flow Rate :l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhaust Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
750	4	1.01	4.06	0.202	0.200	1.483	1.175	1.743E+00	1.4978E-01	1.8929E+00	7.3895E-05	4.5601E-01	1.7957E-05
750	27	1.01	27.38	0.338	0.335	1.350	1.175	1.586E+00	2.5114E-01	1.8376E+00	1.7396E-03	4.3817E-01	1.1469E-04
750	40	1.02	40.80	0.417	0.414	2.550	1.171	2.987E+00	3.0989E-01	3.2966E+00	1.4478E-03	7.9771E-01	1.4485E-04
750	52	1.02	53.04	0.496	0.492	3.467	1.171	4.060E+00	3.6841E-01	4.4288E+00	2.5069E-03	1.0710E+00	1.1941E-04
750	63	1.02	64.26	0.585	0.580	3.800	1.171	4.451E+00	4.3425E-01	4.8851E+00	4.6723E-03	1.1866E+00	1.0488E-04
750	76	1.02	77.58	0.677	0.671	4.350	1.167	5.078E+00	5.0237E-01	5.5807E+00	5.5554E-03	1.3538E+00	6.9661E-05
750	89	1.02	90.84	0.919	0.911	3.867	1.167	4.514E+00	6.8209E-01	5.1961E+00	2.4017E-01	1.0119E+00	5.5521E-04
1000	7	1.02	7.17	0.279	0.277	2.083	1.167	2.432E+00	2.0745E-01	2.6396E+00	1.5199E-03	6.3953E-01	1.0939E-04
1000	16	1.02	16.39	0.356	0.352	3.217	1.167	3.755E+00	2.6379E-01	4.0190E+00	3.1379E-03	9.7375E-01	1.8261E-04
1000	30	1.02	30.73	0.460	0.456	3.800	1.167	4.436E+00	3.4108E-01	4.7773E+00	4.2894E-03	1.1597E+00	2.0514E-04
1000	42	1.02	43.03	0.565	0.559	4.150	1.167	4.845E+00	4.1866E-01	5.2635E+00	6.2671E-03	1.2769E+00	1.9711E-04
1000	56	1.02	57.37	0.691	0.684	4.900	1.167	5.720E+00	5.1226E-01	6.2326E+00	9.5500E-03	1.5072E+00	1.6493E-04
1000	69	1.02	70.69	0.801	0.793	5.950	1.167	6.946E+00	5.9374E-01	7.5399E+00	1.3393E-02	1.8141E+00	5.2706E-05
1000	81	1.03	83.35	0.955	0.946	7.483	1.159	8.674E+00	7.0830E-01	9.3819E+00	1.6848E-02	2.2530E+00	1.8738E-05
1000	95	1.03	98.12	1.241	1.229	5.217	1.159	6.046E+00	9.2024E-01	6.9667E+00	3.4166E-01	1.3429E+00	7.3744E-04

ตารางที่ ก1 (ต่อ) แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: E8SO Supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc/s.	Std. Fuel Flow Rate:cc/s.	Air Flow Rate :l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhaust Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
1200	4	1.03	4.12	0.308	0.305	3.217	1.159	3.728E+00	2.2844E-01	3.9567E+00	4.5567E-03	9.6048E-01	1.5212E-04
1200	15	1.03	15.44	0.416	0.412	3.450	1.163	4.012E+00	3.0835E-01	4.3202E+00	5.6499E-03	1.0507E+00	1.8120E-04
1200	29	1.03	29.86	0.560	0.554	4.050	1.163	4.710E+00	4.1514E-01	5.1247E+00	8.1024E-03	1.2432E+00	1.5864E-04
1200	43	1.03	44.27	0.682	0.675	4.950	1.163	5.756E+00	5.0540E-01	6.2615E+00	1.2528E-02	1.5113E+00	1.8133E-04
1200	58	1.03	59.71	0.826	0.819	6.250	1.163	7.268E+00	6.1288E-01	7.8807E+00	1.6306E-02	1.9033E+00	1.5740E-04
1200	70	1.03	72.07	0.966	0.956	7.917	1.163	9.206E+00	7.1605E-01	9.9220E+00	2.5758E-02	2.3903E+00	1.1394E-04
1200	81	1.03	83.52	1.096	1.086	9.450	1.161	1.097E+01	8.1303E-01	1.1780E+01	3.0698E-02	2.8326E+00	1.0588E-04
1200	100	1.03	102.73	1.485	1.471	6.017	1.161	6.983E+00	1.1011E+00	8.0839E+00	3.7791E-01	1.5681E+00	8.6781E-04
1500	5	1.01	5.07	0.395	0.392	4.600	1.175	5.406E+00	2.9345E-01	5.6990E+00	7.7312E-03	1.3808E+00	1.5935E-04
1500	18	1.01	18.26	0.533	0.529	4.033	1.175	4.740E+00	3.9590E-01	5.1356E+00	7.4179E-03	1.2419E+00	1.3078E-04
1500	34	1.01	34.48	0.703	0.697	4.817	1.175	5.660E+00	5.2181E-01	6.1820E+00	1.1946E-02	1.4893E+00	1.3581E-04
1500	52	1.02	53.04	0.879	0.871	6.967	1.171	8.160E+00	6.5218E-01	8.8120E+00	2.0812E-02	2.1201E+00	1.8479E-04
1500	66	1.02	67.32	1.060	1.051	8.717	1.171	1.021E+01	7.8664E-01	1.0996E+01	2.5434E-02	2.6490E+00	1.6471E-04
1500	74	1.02	75.81	1.225	1.213	10.533	1.167	1.230E+01	9.0790E-01	1.3205E+01	3.1316E-02	3.1710E+00	1.5824E-04
1500	84	1.02	86.01	1.411	1.396	12.633	1.164	1.470E+01	1.0455E+00	1.5746E+01	3.6881E-02	3.7788E+00	1.6510E-04
1500	104	1.03	106.89	1.913	1.892	7.717	1.164	8.979E+00	1.4167E+00	1.0396E+01	5.1582E-01	1.9799E+00	1.0329E-03

ตารางที่ ค1 (ต่อ) แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: ESSO Supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc./s.	Std. Fuel Flow Rate:cc./s.	Air Flow Rate: l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhaust Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
1800	4	1.02	4.10	0.503	0.498	4.233	1.164	4.926E+00	3.7310E-01	5.2990E+00	9.1538E-03	1.2823E+00	8.2021E-05
1800	17	1.02	17.41	0.657	0.652	4.400	1.164	5.120E+00	4.8784E-01	5.6077E+00	1.0727E-02	1.3544E+00	8.1199E-05
1800	32	1.02	32.77	0.893	0.885	7.883	1.164	9.173E+00	6.6280E-01	9.8359E+00	2.2079E-02	2.3710E+00	1.0313E-04
1800	47	1.02	48.13	1.095	1.085	9.083	1.164	1.057E+01	8.1260E-01	1.1382E+01	2.8882E-02	2.7368E+00	1.6481E-04
1800	63	1.02	64.51	1.308	1.296	11.017	1.164	1.282E+01	9.7065E-01	1.3790E+01	3.1627E-02	3.3178E+00	1.6525E-04
1800	80	1.03	82.35	1.541	1.527	13.300	1.162	1.546E+01	1.1434E+00	1.6599E+01	3.3534E-02	3.9912E+00	1.7405E-04
1800	94	1.03	97.07	1.767	1.751	9.867	1.158	1.143E+01	1.3109E+00	1.2740E+01	2.5612E-02	3.0612E+00	1.2086E-04
1800	112	1.04	116.17	2.344	2.323	9.500	1.155	1.097E+01	1.7390E+00	1.2707E+01	4.7573E-01	2.5877E+00	9.8978E-04
2100	5	1.04	5.18	0.585	0.580	4.517	1.158	5.232E+00	4.3402E-01	5.6657E+00	1.2663E-02	1.3649E+00	5.6578E-05
2100	13	1.03	13.43	0.714	0.707	5.083	1.158	5.888E+00	5.2920E-01	6.4173E+00	1.6033E-02	1.5351E+00	6.0879E-05
2100	28	1.03	28.82	0.948	0.939	7.867	1.162	9.142E+00	7.0270E-01	9.8445E+00	2.3059E-02	2.3580E+00	7.8646E-05
2100	44	1.03	45.44	1.204	1.192	7.483	1.158	8.668E+00	8.9262E-01	9.5606E+00	2.6219E-02	2.2871E+00	1.3844E-04
2100	58	1.03	59.99	1.451	1.437	13.017	1.157	1.506E+01	1.0758E+00	1.6133E+01	4.2513E-02	3.8817E+00	1.9333E-04
2100	75	1.03	77.58	1.724	1.707	15.500	1.157	1.793E+01	1.2783E+00	1.9209E+01	5.0241E-02	4.6098E+00	2.1100E-04
2100	89	1.03	92.06	1.978	1.959	15.833	1.157	1.832E+01	1.4667E+00	1.9783E+01	5.2322E-02	4.7445E+00	1.9755E-04
2100	107	1.04	111.17	2.737	2.711	11.493	1.153	1.324E+01	2.0295E+00	1.5270E+01	8.1550E-01	2.8521E+00	1.4487E-03

ตารางที่ ค1 (ต่อ) แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: ESSO Supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc/s.	Std. Fuel Flow Rate:cc/s.	Air Flow Rate :l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhaust Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
2500	6	1.04	6.23	0.731	0.724	5.583	1.153	6.438E+00	5.4196E-01	6.9798E+00	2.0163E-02	1.6750E+00	6.6215E-05
2500	17	1.03	17.58	0.913	0.904	7.667	1.157	8.869E+00	6.7684E-01	9.5456E+00	2.5992E-02	2.2908E+00	8.1024E-05
2500	33	1.03	34.03	1.243	1.231	11.117	1.161	1.290E+01	9.2176E-01	1.3823E+01	2.6578E-02	3.3344E+00	1.3114E-04
2500	49	1.03	50.69	1.561	1.546	14.317	1.157	1.656E+01	1.1575E+00	1.7719E+01	3.3894E-02	4.2740E+00	1.5925E-04
2500	66	1.03	68.27	1.874	1.855	17.333	1.157	2.005E+01	1.3887E+00	2.1440E+01	3.8919E-02	5.1781E+00	1.9269E-04
2500	81	1.04	84.16	2.181	2.159	20.433	1.153	2.356E+01	1.6165E+00	2.5177E+01	4.1772E-02	6.0845E+00	1.8856E-04
2500	96	1.04	99.74	2.509	2.484	22.983	1.153	2.650E+01	1.8599E+00	2.8361E+01	5.4804E-02	6.8452E+00	1.8409E-04
2500	125	1.05	130.70	3.401	3.366	13.633	1.150	1.568E+01	2.5199E+00	1.8199E+01	5.8810E-01	3.8206E+00	7.2696E-04
3000	8	1.03	8.27	0.881	0.872	6.650	1.158	7.698E+00	6.5286E-01	8.3506E+00	1.9478E-02	2.0117E+00	6.2542E-05
3000	18	1.03	18.61	1.095	1.084	8.950	1.158	1.036E+01	8.1190E-01	1.1172E+01	2.1807E-02	2.6948E+00	7.2517E-05
3000	34	1.03	35.00	1.492	1.477	13.333	1.161	1.548E+01	1.1061E+00	1.6590E+01	3.0278E-02	3.9866E+00	1.5739E-04
3000	51	1.03	52.73	1.871	1.852	17.200	1.158	1.991E+01	1.3867E+00	2.1297E+01	3.4503E-02	5.1239E+00	1.4887E-04
3000	68	1.04	70.61	2.259	2.235	21.117	1.154	2.436E+01	1.6736E+00	2.6038E+01	4.2947E-02	6.2807E+00	1.5601E-04
3000	85	1.04	88.16	2.691	2.663	24.733	1.154	2.854E+01	1.9936E+00	3.0531E+01	5.2145E-02	7.3551E+00	1.2196E-04
3000	101	1.04	105.39	3.081	3.047	27.983	1.149	3.214E+01	2.2812E+00	3.4423E+01	6.4503E-02	8.2820E+00	2.5781E-04

ตารางที่ ค1 (ต่อ) แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 27-30/10/97

Engine: TOYOTA 4A-FE

Fuel: ESSO Supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc./s.	Std. Fuel Flow Rate:cc./s.	Air Flow Rate :l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhaust Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
3500	8	1.04	8.33	1.038	1.027	8.583	1.151	9.878E+00	7.6925E-01	1.0647E+01	2.4731E-02	2.5502E+00	6.9109E-05
3500	16	1.04	16.60	1.255	1.241	10.650	1.155	1.230E+01	9.2946E-01	1.3225E+01	3.4076E-02	3.1719E+00	9.9052E-05
3500	31	1.04	32.16	1.692	1.672	15.517	1.155	1.791E+01	1.2521E+00	1.9167E+01	4.0405E-02	4.6027E+00	1.4355E-04
3500	48	1.04	49.79	2.139	2.114	19.783	1.155	2.284E+01	1.5827E+00	2.4424E+01	4.3144E-02	5.8800E+00	2.3170E-04
3500	65	1.04	67.83	2.606	2.576	23.817	1.149	2.737E+01	1.9287E+00	2.9301E+01	4.4039E-02	7.0588E+00	2.0482E-04
3500	82	1.05	85.84	3.061	3.026	26.917	1.146	3.084E+01	2.2656E+00	3.3101E+01	4.7812E-02	7.9996E+00	1.4875E-04
3500	98	1.05	102.98	3.531	3.489	22.333	1.146	2.559E+01	2.6120E+00	2.8197E+01	4.0453E-02	6.8058E+00	7.0394E-05
4000	10	1.02	10.16	1.328	1.317	11.683	1.171	1.368E+01	9.8607E-01	1.4670E+01	3.6224E-02	3.5117E+00	5.1275E-05
4000	16	1.03	16.50	1.512	1.500	13.933	1.160	1.616E+01	1.1233E+00	1.7283E+01	3.9977E-02	4.1504E+00	4.3148E-05
4000	32	1.03	32.99	2.002	1.986	18.850	1.160	2.186E+01	1.4870E+00	2.3350E+01	3.3271E-02	5.6286E+00	1.1659E-05
4000	47	1.03	48.46	2.493	2.473	23.900	1.160	2.772E+01	1.8518E+00	2.9572E+01	3.2612E-02	7.1375E+00	1.4765E-05
4000	65	1.04	67.61	3.019	2.993	28.917	1.152	3.332E+01	2.2409E+00	3.5562E+01	4.8937E-02	8.5725E+00	1.7756E-04
4000	81	1.05	85.00	3.521	3.491	33.750	1.145	3.864E+01	2.6139E+00	4.1254E+01	4.9925E-02	9.9573E+00	1.6479E-04
4000	100	1.05	104.56	4.342	4.300	37.533	1.150	4.317E+01	3.2196E+00	4.6386E+01	7.4471E-01	1.0513E+01	6.7167E-04

ตารางที่ ค2 แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc./s.	Std. Fuel Flow Rate:cc./s.	Air Flow Rate :l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhaust Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
750	6	1.00	5.99	0.201	0.200	1.500	1.190	1.785E+00	1.4944E-01	1.9344E+00	1.6991E-04	4.7580E-01	2.5112E-05
750	11	1.00	11.02	0.249	0.247	1.250	1.186	1.483E+00	1.8517E-01	1.6677E+00	6.5104E-05	4.1020E-01	8.3269E-06
750	29	1.00	29.06	0.355	0.353	3.333	1.186	3.953E+00	2.6411E-01	4.2175E+00	1.4818E-03	1.0348E+00	1.5373E-04
750	43	1.00	43.09	0.416	0.413	3.167	1.186	3.756E+00	3.0946E-01	4.0652E+00	1.6663E-03	9.9616E-01	1.2788E-04
750	56	1.00	56.23	0.503	0.499	3.450	1.182	4.078E+00	3.7379E-01	4.4520E+00	2.5635E-03	1.0909E+00	5.1127E-05
750	69	1.01	69.45	0.588	0.584	3.983	1.182	4.709E+00	4.3729E-01	5.1460E+00	2.7622E-03	1.2610E+00	1.5416E-05
750	79	1.01	79.58	0.684	0.679	4.333	1.178	5.106E+00	5.0866E-01	5.6142E+00	4.4929E-03	1.3740E+00	0.0000E+00
750	91	1.01	92.00	0.916	0.910	4.300	1.178	5.066E+00	6.8158E-01	5.7478E+00	2.5356E-01	1.1423E+00	4.3336E-04
1000	9	1.01	9.06	0.274	0.272	2.400	1.182	2.837E+00	2.0331E-01	3.0403E+00	1.1572E-03	7.4315E-01	6.3758E-05
1000	18	1.01	18.18	0.351	0.349	3.017	1.179	3.557E+00	2.6095E-01	3.8177E+00	1.4158E-03	1.1679E+00	6.0997E-05
1000	33	1.01	33.32	0.457	0.454	3.417	1.179	4.028E+00	3.3967E-01	4.3680E+00	2.9841E-03	1.0663E+00	5.8886E-05
1000	45	1.01	45.44	0.559	0.554	4.250	1.179	5.011E+00	4.1513E-01	5.4260E+00	4.5541E-03	1.3246E+00	4.3347E-05
1000	59	1.01	59.62	0.688	0.683	4.967	1.175	5.836E+00	5.1130E-01	6.3478E+00	7.4342E-03	1.5458E+00	0.0000E+00
1000	71	1.01	71.75	0.808	0.802	5.917	1.175	6.953E+00	6.0039E-01	7.5532E+00	1.0763E-02	1.8393E+00	0.0000E+00
1000	82	1.01	83.17	0.919	0.912	7.717	1.175	9.068E+00	6.8298E-01	9.7511E+00	1.4560E-02	2.3700E+00	0.0000E+00
1000	99	1.02	100.49	1.259	1.249	5.350	1.171	6.266E+00	9.3540E-01	7.2017E+00	3.5311E-01	1.3859E+00	5.6814E-04

ตารางที่ ค2 (ต่อ) แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc./s.	Std. Fuel Flow Rate:cc./s.	Air Flow Rate :l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhaust Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
1200	5	1.00	5.01	0.306	0.304	3.333	1.187	3.956E+00	2.2759E-01	4.1836E+00	3.3889E-03	1.0284E+00	1.2115E-04
1200	19	1.01	19.11	0.437	0.434	3.467	1.183	4.101E+00	3.2472E-01	4.4253E+00	4.7508E-03	1.0864E+00	1.0606E-04
1200	32	1.01	32.32	0.562	0.558	4.150	1.179	4.893E+00	4.1799E-01	5.3107E+00	7.4117E-03	1.3014E+00	9.5459E-05
1200	46	1.01	46.50	0.692	0.687	4.833	1.175	5.680E+00	5.1439E-01	6.1939E+00	9.7325E-03	1.5178E+00	7.4224E-05
1200	61	1.01	61.67	0.821	0.816	6.133	1.175	7.207E+00	6.1073E-01	7.8179E+00	1.3276E-02	1.9133E+00	3.5131E-05
1200	74	1.01	74.87	0.991	0.983	7.983	1.174	9.375E+00	7.3621E-01	1.0111E+01	2.0526E-02	2.4699E+00	5.0485E-06
1200	86	1.01	86.94	1.133	1.125	9.433	1.178	1.111E+01	8.4212E-01	1.1956E+01	2.5905E-02	2.9115E+00	0.0000E+00
1200	106	1.01	107.33	1.512	1.501	6.067	1.174	7.120E+00	1.1238E+00	8.2434E+00	3.7547E-01	1.6281E+00	6.1328E-04
1500	5	1.01	5.07	0.389	0.386	3.800	1.173	4.457E+00	2.8921E-01	4.7458E+00	5.8823E-03	1.1637E+00	6.6349E-05
1500	18	1.01	18.24	0.530	0.526	4.067	1.173	4.769E+00	3.9358E-01	5.1629E+00	6.7016E-03	1.2683E+00	7.7336E-05
1500	32	1.02	32.55	0.700	0.695	4.817	1.173	5.649E+00	5.2025E-01	6.1692E+00	1.2644E-02	1.5155E+00	1.1705E-04
1500	47	1.02	47.84	0.867	0.860	6.567	1.172	7.696E+00	6.4378E-01	8.3401E+00	1.8314E-02	2.0463E+00	1.1660E-04
1500	62	1.02	63.16	1.067	1.058	8.567	1.171	1.003E+01	7.9237E-01	1.0826E+01	2.2505E-02	2.6595E+00	1.1892E-04
1500	77	1.02	78.50	1.244	1.234	10.717	1.167	1.251E+01	9.2408E-01	1.3435E+01	2.9371E-02	3.2963E+00	1.0062E-04
1500	90	1.02	92.16	1.420	1.409	12.367	1.164	1.439E+01	1.0546E+00	1.5445E+01	2.9393E-02	3.7870E+00	6.9404E-05
1500	108	1.02	110.59	1.928	1.912	7.800	1.164	9.076E+00	1.4312E+00	1.0507E+01	5.0033E-01	2.0624E+00	8.0794E-04

ตารางที่ ค2 (ต่อ) แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc/s.	Std. Fuel Flow Rate:cc/s.	Air Flow Rate :l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhaust Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
1800	6	1.02	6.12	0.498	0.494	3.783	1.167	4.417E+00	3.6993E-01	4.7867E+00	8.1286E-03	1.1730E+00	8.3650E-05
1800	19	1.02	19.37	0.676	0.670	5.133	1.167	5.993E+00	5.0192E-01	6.4947E+00	1.2233E-02	1.5895E+00	1.0053E-04
1800	33	1.02	33.62	0.871	0.864	7.317	1.168	8.547E+00	6.4658E-01	9.1938E+00	2.1355E-02	2.2430E+00	1.1476E-04
1800	49	1.02	49.79	1.093	1.084	9.083	1.168	1.061E+01	8.1176E-01	1.1423E+01	2.4637E-02	2.7798E+00	5.7034E-05
1800	65	1.01	65.92	1.328	1.318	11.800	1.172	1.383E+01	9.8660E-01	1.4817E+01	2.7908E-02	3.6103E+00	3.6990E-05
1800	82	1.01	83.16	1.563	1.551	13.617	1.172	1.596E+01	1.1610E+00	1.7120E+01	3.1579E-02	4.1663E+00	5.1289E-05
1800	96	1.01	97.36	1.790	1.774	10.217	1.172	1.197E+01	1.3284E+00	1.3303E+01	2.3629E-02	3.2373E+00	1.3284E-05
1800	117	1.02	119.38	2.431	2.412	9.667	1.167	1.128E+01	1.8056E+00	1.3083E+01	5.3323E-01	2.6643E+00	1.0452E-03
2100	5	1.00	5.01	0.572	0.568	4.417	1.187	5.242E+00	4.2548E-01	5.6672E+00	1.2113E-02	1.3818E+00	5.6593E-05
2100	16	1.00	16.05	0.746	0.740	5.050	1.183	5.973E+00	5.5427E-01	6.5277E+00	1.3697E-02	1.5906E+00	5.2149E-05
2100	31	1.00	31.10	0.978	0.971	7.650	1.183	9.049E+00	7.2674E-01	9.7757E+00	2.2230E-02	2.3760E+00	8.2977E-05
2100	46	1.00	46.06	1.242	1.234	10.817	1.187	1.284E+01	9.2363E-01	1.3761E+01	3.1292E-02	3.3446E+00	8.2450E-05
2100	62	1.00	62.20	1.502	1.491	13.150	1.183	1.555E+01	1.1165E+00	1.6671E+01	4.0351E-02	4.0468E+00	7.4916E-05
2100	77	1.01	77.50	1.754	1.741	15.567	1.179	1.835E+01	1.3037E+00	1.9656E+01	4.8726E-02	4.7714E+00	4.9072E-05
2100	93	1.01	93.60	2.028	2.013	17.983	1.179	2.120E+01	1.5074E+00	2.2709E+01	5.8067E-02	5.5090E+00	4.5355E-05
2100	112	1.02	114.09	3.123	3.098	11.350	1.168	1.326E+01	2.3195E+00	1.5578E+01	8.7209E-01	2.9359E+00	1.5946E-03

ตารางที่ ก2 (ต่อ) แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc./s.	Std. Fuel Flow Rate:cc./s.	Air Flow Rate :l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhanst Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
2500	7	1.01	7.05	0.736	0.731	5.883	1.178	6.932E+00	5.4706E-01	7.4788E+00	2.0948E-02	1.8120E+00	7.4683E-06
2500	18	1.01	18.13	0.938	0.931	7.867	1.178	9.268E+00	6.9708E-01	9.9655E+00	2.4120E-02	2.4206E+00	9.9516E-06
2500	35	1.01	35.26	1.275	1.266	11.167	1.178	1.316E+01	9.4765E-01	1.4104E+01	2.5465E-02	3.4345E+00	7.0422E-06
2500	52	1.01	52.65	1.595	1.583	14.433	1.174	1.694E+01	1.1855E+00	1.8124E+01	3.0247E-02	4.4217E+00	9.0493E-06
2500	68	1.01	68.85	1.913	1.898	17.733	1.174	2.081E+01	1.4210E+00	2.2232E+01	3.3631E-02	5.4274E+00	1.1101E-05
2500	85	1.01	86.07	2.222	2.204	20.600	1.174	2.418E+01	1.6505E+00	2.5826E+01	3.8563E-02	6.3087E+00	0.0000E+00
2500	99	1.02	100.52	2.554	2.533	22.967	1.169	2.685E+01	1.8966E+00	2.8743E+01	5.1616E-02	7.0038E+00	0.0000E+00
2500	123	1.02	125.60	3.418	3.389	13.567	1.166	1.582E+01	2.5376E+00	1.8355E+01	6.0280E-01	3.9011E+00	9.9895E-04
3000	8	1.02	8.12	0.881	0.874	7.350	1.171	8.609E+00	6.5423E-01	9.2630E+00	2.4951E-02	2.2471E+00	3.7000E-05
3000	16	1.02	16.24	1.078	1.069	9.283	1.171	1.087E+01	8.0016E-01	1.1673E+01	2.6659E-02	2.8390E+00	2.3314E-05
3000	34	1.02	34.51	1.485	1.473	13.433	1.171	1.573E+01	1.1025E+00	1.6836E+01	2.8920E-02	4.0999E+00	8.4065E-06
3000	50	1.02	50.93	1.859	1.843	17.117	1.168	2.000E+01	1.3798E+00	2.1375E+01	3.1918E-02	5.1527E+00	0.0000E+00
3000	62	1.02	63.00	2.264	2.245	21.033	1.168	2.457E+01	1.6810E+00	2.6252E+01	3.4844E-02	6.4128E+00	1.3108E-05
3000	84	1.02	85.74	2.663	2.639	24.767	1.164	2.884E+01	1.9758E+00	3.0813E+01	4.4507E-02	7.5223E+00	0.0000E+00
3000	100	1.02	102.07	3.072	3.044	27.967	1.164	3.256E+01	2.2792E+00	3.4843E+01	5.4068E-02	8.5060E+00	0.0000E+00
3000	126	1.02	128.92	4.218	4.182	16.750	1.162	1.947E+01	3.1313E+00	2.2596E+01	1.1170E+00	4.4179E+00	1.3088E-03

ตารางที่ ก2 (ต่อ) แสดงข้อมูลของเครื่องยนต์ที่ปรับค่าตาม AS 2789.1-1985

Test Date 5-8/11/97

Engine : TOYOTA 4A-FE

Fuel : ESSO supreme 98

Standard Condition : AUSTRALIAN STANDARD AS 2789.1-1985

Engine Speed: RPM.	Mea. Engine Torque:Nm.	Correction Factor	Std. Engine Torque:Nm.	Fuel Flow Rate:cc./s.	Std. Fuel Flow Rate:cc./s.	Air Flow Rate :l/s	Air Density at This Condition :kg/m3	Standard Air Flow Rate :g/s	Std. Fuel Flow Rate:g/s.	Exhaust Flow Rate : g/s	CO: g/s	CO2: g/s	HC : g/s
3500	8	1.00	8.02	1.068	1.063	9.217	1.186	1.093E+01	7.9567E-01	1.1727E+01	2.8956E-02	2.8574E+00	7.0263E-05
3500	16	1.01	16.10	1.284	1.277	11.617	1.182	1.373E+01	9.5606E-01	1.4688E+01	4.0425E-02	3.5745E+00	8.0672E-05
3500	32	1.01	32.21	1.719	1.709	16.133	1.182	1.907E+01	1.2796E+00	2.0351E+01	3.7340E-02	4.9775E+00	7.1128E-05
3500	48	1.01	48.35	2.176	2.162	19.633	1.178	2.313E+01	1.6184E+00	2.4750E+01	3.7682E-02	5.9169E+00	4.9432E-05
3500	66	1.01	66.43	2.649	2.632	24.317	1.182	2.874E+01	1.9702E+00	3.0715E+01	4.2866E-02	7.5312E+00	1.5336E-05
3500	83	1.01	83.97	3.102	3.081	27.300	1.174	3.206E+01	2.3065E+00	3.4365E+01	5.0980E-02	8.4316E+00	6.8635E-05
3500	99	1.02	100.53	3.566	3.541	23.800	1.174	2.795E+01	2.6514E+00	3.0600E+01	4.0018E-02	7.5172E+00	0.0000E+00
3500	124	1.03	127.18	4.751	4.713	19.733	1.162	2.293E+01	3.5289E+00	2.6461E+01	1.0513E+00	5.4413E+00	9.6447E-04
4000	10	1.02	10.15	1.313	1.304	11.617	1.174	1.364E+01	9.7652E-01	1.4618E+01	3.4811E-02	3.5687E+00	7.2989E-06
4000	16	1.01	16.19	1.516	1.506	13.767	1.174	1.617E+01	1.1274E+00	1.7294E+01	3.9832E-02	4.2245E+00	8.6349E-06
4000	32	1.01	32.38	2.021	2.007	19.033	1.174	2.235E+01	1.5025E+00	2.3854E+01	3.4455E-02	5.8489E+00	1.1910E-05
4000	49	1.02	49.87	2.552	2.533	23.817	1.169	2.784E+01	1.8966E+00	2.9737E+01	3.6568E-02	7.3006E+00	0.0000E+00
4000	65	1.02	66.16	3.053	3.030	28.650	1.169	3.349E+01	2.2683E+00	3.5759E+01	4.1530E-02	8.7680E+00	0.0000E+00
4000	83	1.02	84.78	3.586	3.559	33.533	1.164	3.902E+01	2.6647E+00	4.1684E+01	3.9869E-02	1.0227E+01	2.0813E-05
4000	102	1.02	104.36	4.337	4.304	37.800	1.164	4.401E+01	3.2224E+00	4.7235E+01	6.7167E-01	1.0930E+01	4.4811E-04
4000	121	1.03	124.35	5.478	5.435	28.433	1.158	3.293E+01	4.0689E+00	3.7003E+01	1.6605E+00	7.4617E+00	1.0716E-03

ภาคผนวก ง

ข้อมูลป้อนเข้าโปรแกรมแบบจำลอง (Input Data)

ภาคผนวก ง1 ข้อมูลเครื่องยนต์ (Engine Performance and Emission Maps) ป้อนเข้าโปรแกรม V.F.C.E. Model

ตารางที่ ง1 แสดงข้อมูลเครื่องยนต์ที่ใช้ป้อนเข้าโปรแกรม V.F.C.E. Model

Engine Speed	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
Engine Torque 1	Engine Torque 2	Engine Torque 3	Engine Torque 4	Engine Torque 5	Engine Torque 6	Engine Torque 7	Engine Torque 8	Engine Torque 9	Engine Torque 10	Engine Torque 11	Engine Torque 12	Engine Torque 13	Engine Torque 14	Engine Torque 15	Engine Torque 16	Engine Torque 17	Engine Torque 18	Engine Torque 19
FC at TE1	FC at TE2	FC at TE3	FC at TE4	FC at TE5	FC at TE6	FC at TE7	FC at TE8	FC at TE9	FC at TE10	FC at TE11	FC at TE12	FC at TE13	FC at TE14	FC at TE15	FC at TE16	FC at TE17	FC at TE18	FC at TE19
NOX at TE1	NOX at TE2	NOX at TE3	NOX at TE4	NOX at TE5	NOX at TE6	NOX at TE7	NOX at TE8	NOX at TE9	NOX at TE10	NOX at TE11	NOX at TE12	NOX at TE13	NOX at TE14	NOX at TE15	NOX at TE16	NOX at TE17	NOX at TE18	NOX at TE19
CO at TE1	CO at TE2	CO at TE3	CO at TE4	CO at TE5	CO at TE6	CO at TE7	CO at TE8	CO at TE9	CO at TE10	CO at TE11	CO at TE12	CO at TE13	CO at TE14	CO at TE15	CO at TE16	CO at TE17	CO at TE18	CO at TE19
CO2 at TE1	CO2 at TE2	CO2 at TE3	CO2 at TE4	CO2 at TE5	CO2 at TE6	CO2 at TE7	CO2 at TE8	CO2 at TE9	CO2 at TE10	CO2 at TE11	CO2 at TE12	CO2 at TE13	CO2 at TE14	CO2 at TE15	CO2 at TE16	CO2 at TE17	CO2 at TE18	CO2 at TE19
HC at TE1	HC at TE2	HC at TE3	HC at TE4	HC at TE5	HC at TE6	HC at TE7	HC at TE8	HC at TE9	HC at TE10	HC at TE11	HC at TE12	HC at TE13	HC at TE14	HC at TE15	HC at TE16	HC at TE17	HC at TE18	HC at TE19
MAP at TE1	MAP at TE2	MAP at TE3	MAP at TE4	MAP at TE5	MAP at TE6	MAP at TE7	MAP at TE8	MAP at TE9	MAP at TE10	MAP at TE11	MAP at TE12	MAP at TE13	MAP at TE14	MAP at TE16	MAP at TE16	MAP at TE17	MAP at TE18	MAP at TE19
7.5000E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
4.0600E+0	7.5000E+0	1.5000E+1	2.2500E+1	3.0000E+1	3.7500E+1	4.5000E+1	5.2500E+1	6.0000E+1	6.7600E+1	7.5000E+1	8.2500E+1	9.0840E+1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.4976E-1	1.3341E-1	1.6563E-1	2.2077E-1	2.6474E-1	2.9681E-1	3.2768E-1	3.6540E-1	4.0933E-1	4.5203E-1	4.8980E-1	5.3689E-1	6.8195E-1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
7.7041E-5	1.8547E-4	4.9967E-4	8.9219E-4	1.3461E-3	1.8520E-3	2.4036E-3	2.9963E-3	3.6266E-3	4.2917E-1	4.9896E-3	5.7179E-3	2.3997E-1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
4.5612E-1	5.1643E-1	4.3478E-1	3.8663E-1	4.9115E-1	6.9934E-1	9.1236E-1	1.0631E+0	1.1487E+0	1.2191E+0	1.3165E+0	1.3837E+0	1.0125E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.7790E-5	3.4017E-5	6.6620E-5	1.0086E-4	1.2391E-4	1.3638E-4	1.3767E-4	1.2890E-4	1.1187E-4	9.1769E-5	7.4438E-5	6.7434E-5	5.5477E-4	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5266E+2	2.5581E+2	2.9364E+2	3.4280E+2	3.8865E+2	4.3085E+2	4.7423E+2	5.2210E+2	5.7327E+2	6.2261E+2	6.6508E+2	7.0316E+2	7.6695E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.0000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
7.1700E+0	1.5000E+1	2.2500E+1	3.0000E+1	3.7500E+1	4.5000E+1	5.2500E+1	6.0000E+1	6.7500E+1	7.5000E+1	8.2500E+1	9.0000E+1	9.8120E+1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.0736E-1	2.6773E-1	2.9430E-1	3.3577E-1	3.8326E-1	4.3308E-1	4.8126E-1	5.2677E-1	5.7298E-1	6.2723E-1	6.9854E-1	7.9346E-1	9.2034E-1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	4.2917E-1	4.9895E-3	5.7179E-3	2.3997E-1	2.3997E-1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.6858E-3	1.3475E-3	6.3885E-3	6.3119E-3	3.8337E-2	4.0403E-3	8.4675E-3	1.3598E-2	1.3775E-2	8.5216E-2	1.4282E-2	8.0570E-2	3.41423-1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
6.3840E-1	9.5048E-1	1.0608E+0	1.1401E+0	1.2269E+0	1.3186E+0	1.4157E+0	1.5395E+0	1.7233E+0	1.9777E+0	2.2297E+0	2.2353E+1	1.3423E+1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.0914E-4	1.7717E-4	1.9808E-4	2.0240E-4	2.0290E-4	1.9932E-4	1.8319E-4	1.4499E-4	8.3972E-5	2.5276E-5	1.1325E-5	1.6702E-4	3.8197E-5	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5277E+2	2.8977E+2	3.2815E+2	3.7030E+2	4.1476E+2	4.5879E+2	5.0110E+2	5.4188E+2	5.8271E+2	6.2541E+2	6.7259E+2	7.1304E+2	7.4271E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.2000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
4.1200E+0	7.5000E+0	1.5000E+1	2.2500E+1	3.0000E+1	3.7500E+1	4.6000E+1	5.2500E+1	6.0000E+1	6.7500E+1	7.5009E+1	8.2600E+1	9.0000E+1	9.7500E+1	1.0273E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.2849E-1	2.4710E-1	3.0455E-1	3.6413E-1	4.1656E-1	4.6370E-1	5.0836E-1	5.5959E-1	6.1604E-1	6.7717E-1	7.4008E-1	8.0417E-1	8.7707E-1	9.8271E-1	1.1011E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
4.6803E-3	1.2815E-3	4.6697E-3	9.1180E-3	9.8112E-3	8.9704E-3	1.0016E-2	1.4192E-2	1.9659E-2	2.3050E-2	2.3503E-2	2.9152E-2	6.6090E-2	1.8980E-2	3.7776E-1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
9.0666E-1	9.8475E-1	1.0455E+0	1.1342E+0	1.2475E+0	1.3774E+0	1.5234E+0	1.6969E+0	1.9164E+0	2.1944E+0	2.5153E+0	2.8045E+0	2.8896E+0	2.4516E+0	1.5686E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.5242E-4	1.7414E-4	1.8061E-4	1.6805E-4	1.6206E-4	1.6738E-4	1.7662E-4	1.7805E-4	1.6270E-4	1.3091E-4	9.8318E-6	1.0119E-4	2.0125E-4	4.8983E-4	8.6751E-4	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.6606E+2	2.6265E+2	2.9172E+2	3.3068E+2	3.7176E+2	4.1137E+2	4.4903E+2	4.8627E+2	5.2552E+2	5.6019E+2	6.1759E+2	6.6936E+2	7.1891E+2	7.5563E+2	7.6498E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0

ตารางที่ ง1 (ต่อ) แสดงข้อมูลเครื่องยนต์ที่ใช้ป้อนเข้าโปรแกรม V.F.C.E. Model

1.6000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
5.0700E+0	7.6000E+0	1.5000E+1	2.2500E+1	3.0000E+1	3.7500E+1	4.5000E+1	5.2500E+1	6.0000E+1	6.7500E+1	7.5000E+1	8.2500E+1	9.0000E+1	9.7500E+1	1.0689E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.9353E-1	3.0640E-1	3.6556E-1	4.3330E-1	4.9247E-1	5.4242E-1	5.9021E-1	6.4463E-1	7.1221E-1	7.9517E-1	8.9389E-1	9.9616E-1	1.1061E+0	1.2250E+0	1.4168E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
7.7754E-3	3.7834E-3	4.7256E-3	1.0006E-2	1.2317E-2	1.2705E-2	1.4362E-2	1.8842E-2	2.4704E-2	2.8585E-2	2.8698E-2	3.0756E-2	5.6237E-2	1.5359E-1	5.1608E-1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.3812E+0	1.3542E+0	1.2673E+0	1.2539E+0	1.3762E+0	1.8623E+0	1.8328E+0	2.08787+0	2.3598E+0	2.6851E+0	3.0976E+0	3.5750E+0	3.9653E+0	3.8853E+0	1.9778E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.5946E-4	1.5394E-4	1.3601E-4	1.2606E-4	1.2944E-4	1.4448E-4	1.6443E-4	1.8015E-4	1.8360E-4	1.7206E-4	1.6314E-4	1.6052E-4	2.1054E-4	4.90947-4	1.3333E-3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.6907E+2	2.7760E+2	2.8062E+2	3.1889E+2	3.5545E+2	3.8606E+2	4.1374E+2	4.4434E+2	4.48309+2	5.3239E+2	5.9060E+2	6.5197E+2	7.0774E+2	7.4826E+2	7.6695E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0

1.8000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
4.1000E+0	7.5000E+0	1.5000E+1	2.2500E+1	3.0000E+1	3.7500E+1	4.5000E+1	5.2500E+1	6.0000E+1	6.7500E+1	7.5000E+1	8.2500E+1	9.0000E+1	9.7500E+1	1.0500E+2	1.1161E+2	0.0000E+0	0.0000E+0	0.0000E+0
3.7302E-1	3.9208E-1	4.6175E-1	5.4666E-1	6.3151E-1	7.1084E-1	7.8475E-1	8.5566E-1	9.26767-1	9.9767E-1	1.0789E+0	1.1458E+0	1.2252E+0	1.3163E+0	1.4358E+0	1.7389E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
9.3146E-3	1.6310E-3	6.0393E-3	1.7264E-2	2.3743E-2	2.4940E-2	2.4703E-2	2.6640E-2	3.1631E-2	3.6752E-2	3.7735E-2	3.1445E-2	2.1887E-2	2.7633E-2	9.1374E-2	4.7543E-1	0.0000E+0	0.0000E+0	0.0000E+0
1.2821E+0	9.6461E-1	1.1676E+0	1.7670E+0	2.2558E+0	2.5251E+0	2.6682E+0	2.8301E+0	3.1059E+0	3.4852E+0	3.8442E+0	3.9851E+0	3.7217E+0	3.0140E+0	2.1479E+0	2.5865E+0	0.0000E+0	0.0000E+0	0.0000E+0
8.2929E-5	6.6143E-5	6.9223E-5	9.1814E-5	1.1123E-4	1.2509E-4	1.3829E-4	1.5485E-4	1.7345E-4	1.8690E-4	1.8534E-4	1.6327E-4	1.3040E-4	1.2629E-4	2.3882E-4	9.8896E-4	0.0000E+0	0.0000E+0	0.0000E+0
2.5894E+2	2.6510E+2	2.8795E+2	3.2021E+2	3.5782E+2	3.5782E+2	3.9716E+2	4.3561E+2	4.7168E+2	5.0518E+2	5.6989E+2	5.6873E+2	6.3916E+2	6.7916E+2	7.1976E+2	7.6602E+2	0.0000E+0	0.0000E+0	0.0000E+0

2.1000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
6.1800E+0	7.5000E+1	1.6000E+1	2.2500E+1	3.0000E+1	3.7500E+1	4.5000E+1	5.2500E+1	6.0000E+1	6.7600E+1	7.5000E+1	8.2500E+1	9.0000E+1	9.7500E+1	1.0500E+1	1.1117E+1	0.0000E+0	0.0000E+0	0.0000E+0
4.3372E-1	4.6146E-1	5.4776E-1	6.3099E-1	7.1426E-1	8.0031E-1	8.8971E-1	9.8159E-1	1..736E+0	1.1634E+0	1.2600E+0	1.3369E+0	1.4349E+0	1.5661E+0	1.7686E+0	2.0296E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.2896E-2	1.0961E-2	1.7250E-2	2.3938E-2	2.4152E-2	2.2010E-2	2.3766E-2	3.2196E-2	4.4491E-2	5.3470E-2	5.2202E-2	4.2005E-2	4.3830E-2	1.1303E-1	3.5750E-1	8.1551E-1	0.0000E+0	0.0000E+0	0.0000E+0
1.3273E+0	1.4074E+0	1.7139E+0	1.9721E+0	2.1609E+0	2.3474E+0	2.6171E+0	3.0239E+0	3.5607E+0	4.1503E+0	4.6568E+0	4.9174E+0	4.7944E+0	4.2480E+0	3.4286E+0	2.8579E+0	0.0000E+0	0.0000E+0	0.0000E+0
5.7338E-5	5.4346E-5	6.9648E-5	7.3114E-5	8.5222E-5	1.0238E-4	1.2949E-4	1.6507E-4	1.9982E-4	2.1988E-4	2.1484E-4	1.9037E-4	1.8571E-4	2.9572E-4	6.9777E-4	1.4486E-3	0.0000E+0	0.0000E+0	0.0000E+0
2.5762E+2	2.6919E+2	3.0454E+2	3.3963E+2	3.7585E+2	4.1289E+2	4.4980E+2	4.8577E+2	5.2056E+2	5.5471E+2	5.8934E+2	6.2571E+2	6.6450E+2	7.0468E+2	7.4220E+2	7.6506E+2	0.0000E+0	0.0000E+0	0.0000E+0

2.6000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
6.2300E+0	7.5000E+0	1.5000E+1	2.2500E+1	3.0000E+1	3.7500E+1	4.5000E+1	5.2500E+1	6.0000E+1	6.7500E+1	7.5000E+1	8.2500E+1	9.0000E+1	9.7500E+1	1.0500E+2	1.1250E+2	1.2000E+2	1.2750E+2	1.3070E+2
5.4204E-1	5.6297E-1	6.4034E-1	7.4887E-1	8.6239E-1	9.7286E-1	1.0777E+0	1.1778E+0	1.2754E+0	1.3731E+0	1.4730E+0	1.5763E+0	1.6834E+0	1.7944E+0	1.9102E+0	2.0339E+0	2.1728E+0	2.3407E+0	2.4265E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.0246E-2	2.1237E-2	2.4995E-2	2.6338E-2	2.6918E-2	2.8026E-2	3.0282E-2	3.3556E-2	3.7093E-2	3.9857E-2	4.1090E-2	4.1087E-2	4.2188E-2	4.9980E-2	7.4723E-2	1.3298E-1	2.4949E-1	4.5916E-1	5.8818E-1
1.6752E+0	1.7290E+0	2.1300E+0	2.6048E+0	3.0879E+0	3.5453E+0	3.9678E+0	4.3631E+0	4.7481E+0	5.1414E+0	5.5550E+0	5.9862E+0	6.4094E+0	6.7657E+0	6.9576E+0	6.8367E+0	6.1957E+0	4.7591E+0	3.8199E+0
6.5887E-5	6.5629E-5	7.5977E-5	9.6060E-5	1.1736E-4	1.3654E-4	1.5200E-4	1.6705E-4	1.7879E-4	1.8758E-4	1.9226E-4	1.9190E-4	1.8730E-4	1.8311E-4	1.9063E-4	2.3119E-4	3.4029E-4	5.7232E-4	7.2710E-4
2.5703E+2	2.5975E+2	2.8421E+2	3.1756E+2	3.5259E+2	3.8789E+2	4.2192E+2	4.5852E+2	4.8748E+2	5.2075E+2	5.5534E+2	5.9145E+2	6.2857E+2	6.6547E+2	7.0023E+2	7.3040E+2	7.5323E+2	7.6609E+2	7.6800E+2

ตารางที่ ง1 (ต่อ) แสดงข้อมูลเครื่องยนต์ที่ใช้ป้อนเข้าโปรแกรม V.F.C.E. Model

3.0000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
8.2700E+0	1.5000E+1	2.2600E+1	3.0000E+1	3.7500E+1	4.5000E+1	5.2500E+1	6.0000E+1	6.7500E+1	7.6000E+1	8.2500E+1	9.0000E+1	9.7500E+1	1.0539E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
6.5285E-1	7.4940E-1	8.8258E-1	1.0191E+0	1.1480E+0	1.2681E+0	1.3832E+0	1.4990E+0	1.6206E+0	1.7607E+0	1.8881E+0	2.0277E+0	2.1607E+0	2.2812E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.9479E-2	1.9863E-2	2.4242E-2	2.8374E-2	3.0994E-2	3.2649E-2	3.4436E-2	3.7257E-2	4.1109E-2	4.5575E-2	4.9669E-2	5.2863E-2	5.6197E-2	6.4570E-2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.0117E+0	2.4112E+0	3.0163E+0	3.6191E+0	4.1696E+0	4.6454E+0	5.1989E+0	5.5829E+0	6.0742E+0	6.6691E+0	7.0369E+0	7.4517E+0	7.8256E+0	8.2822E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
6.2553E-5	6.1068E-5	1.0067E-4	1.4379E-4	1.5988E-4	1.5641E-4	1.4902E-4	1.4834E-4	1.5401E-4	1.5686E-4	1.4222E-4	1.1639E-4	1.1430E-4	2.5792E-4	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.6000E+2	2.8258E+2	3.1602E+2	3.5134E+2	3.8550E+2	4.1801E+2	4.4955E+2	4.8108E+2	5.1318E+2	5.4585E+2	5.7856E+2	6.1074E+2	6.4258E+2	6.7811E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0

3.5000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
8.3300E+0	1.5000E+1	2.2500E+1	3.0000E+1	3.7500E+1	4.5000E+1	5.2500E+1	6.0000E+1	6.7500E+1	7.5000E+1	8.2500E+1	9.0000E+1	9.7500E+1	1.0298E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
7.6917E-1	8.9668E-1	1.0550E+0	1.2095E+0	1.3646E+0	1.4940E+0	1.6334E+0	1.7764E+0	1.9222E+0	2.0668E+0	2.2057E+0	2.3395E+0	2.4821E+0	2.6121E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.4723E-2	3.2832E-2	3.7347E-2	3.9857E-2	4.1548E-2	4.2691E-2	4.3316E-2	4.3607E-2	4.4010E-2	4.5056E-2	4.6910E-2	4.8626E-2	4.7133E-2	4.0444E-2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5600E+0	3.0302E+0	3.7267E+0	4.4175E+0	5.0306E+0	5.5648E+0	6.0546E+0	6.5394E+0	7.0368E+0	7.5206E+0	7.9026E+0	8.0181E+0	7.6173E+0	6.8062E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
6.9068E-5	9.6917E-5	1.0728E-4	1.3274E-4	1.7401E-4	2.1455E-4	2.3686E-4	2.3255E-4	2.0617E-4	1.7351E-4	1.5216E-4	1.4796E-4	1.3377E-4	7.0294E-5	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5798E+2	2.8824E+2	3.2666E+2	3.6222E+2	3.9642E+2	4.2857E+2	4.5971E+2	4.9079E+2	5.2230E+2	5.5412E+2	5.8585E+2	6.1737E+2	6.4983E+2	6.7613E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0

4.0000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.0160E+1	1.5000E+1	2.2500E+1	3.0000E+1	3.7600E+1	4.5000E+1	5.2500E+1	6.0000E+1	6.7500E+1	7.5000E+1	8.2500E+1	9.0000E+1	9.7500E+1	1.0456E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
9.8602E-1	1.0920E+0	1.2496E+0	1.4169E+0	1.5945E+0	1.7726E+0	1.9408E+0	2.0948E+0	2.2388E+0	2.3853E+0	2.5515E+0	2.7517E+0	2.9874E+0	3.2197E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
3.6223E-2	3.9166E-2	4.0694E-2	3.6784E-2	3.0299E-2	3.0228E-2	3.6870E-2	4.5607E-2	4.8956E-2	4.3823E-2	4.2929E-2	9.0437E-2	2.8176E-1	7.4486E-1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
3.5114E+0	4.0165E+0	4.6614E+0	5.3382E+0	6.0787E+0	6.8182E+0	7.4879E+0	8.0542E+0	8.5651E+0	9.1002E+0	9.7286E+0	1.0413E+1	1.0877E+1	1.0513E+1	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
5.1284E-5	4.3334E-5	3.9842E-5	2.1256E-5	4.3685E-8	1.6113E-6	4.0386E-5	1.0852E-4	1.7676E-4	2.0783E-4	1.8216E-4	1.3605E-4	2.1214E-4	6.7184E-4	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.7169E+2	2.9108E+2	3.2261E+2	3.5824E+2	3.9626E+2	4.3342E+2	4.6721E+2	4.9719E+2	5.2529E+2	5.5494E+2	5.8928E+2	6.2832E+2	6.6453E+2	6.9710E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0

ภาคผนวก ง2 ข้อมูลเครื่องยนต์ (Engine Performance and Emission Maps) ป้อนเข้าโปรแกรมแบบจำลองที่ถูกดัดแปลง

ตารางที่ ง2 แสดงข้อมูลเครื่องยนต์ที่ใช้ป้อนเข้าโปรแกรมแบบจำลองที่ดัดแปลง

Engine Speed	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
MAP1 (mmHg)	MAP2 (mmHg)	MAP3 (mmHg)	MAP4 (mmHg)	MAP5 (mmHg)	MAP6 (mmHg)	MAP7 (mmHg)	MAP8 (mmHg)	MAP9 (mmHg)	MAP10 (mmHg)	MAP11 (mmHg)	MAP12 (mmHg)	MAP13 (mmHg)	MAP14 (mmHg)	MAP15 (mmHg)	MAP16 (mmHg)	MAP17 (mmHg)	MAP18 (mmHg)	MAP19 (mmHg)
FC at MAP1	FC at MAP2	FC at MAP3	FC at MAP4	FC at MAP5	FC at MAP6	FC at MAP7	FC at MAP8	FC at MAP9	FC at MAP10	FC at MAP11	FC at MAP12	FC at MAP13	FC at MAP14	FC at MAP15	FC at MAP16	FC at MAP17	FC at MAP18	FC at MAP19
NOX at MAP1	NOX at MAP2	NOX at MAP3	NOX at MAP4	NOX at MAP5	NOX at MAP6	NOX at MAP7	NOX at MAP8	NOX at MAP9	NOX at MAP10	NOX at MAP11	NOX at MAP12	NOX at MAP13	NOX at MAP14	NOX at MAP15	NOX at MAP16	NOX at MAP17	NOX at MAP18	NOX at MAP19
CO at MAP1	CO at MAP2	CO at MAP3	CO at MAP4	CO at MAP5	CO at MAP6	CO at MAP7	CO at MAP8	CO at MAP9	CO at MAP10	CO at MAP11	CO at MAP12	CO at MAP13	CO at MAP14	CO at MAP15	CO at MAP16	CO at MAP17	CO at MAP18	CO at MAP19
CO2 at MAP1	CO2 at MAP2	CO2 at MAP3	CO2 at MAP4	CO2 at MAP5	CO2 at MAP6	CO2 at MAP7	CO2 at MAP8	CO2 at MAP9	CO2 at MAP10	CO2 at MAP11	CO2 at MAP12	CO2 at MAP13	CO2 at MAP14	CO2 at MAP15	CO2 at MAP16	CO2 at MAP17	CO2 at MAP18	CO2 at MAP19
HC at MAP1	HC at MAP2	HC at MAP3	HC at MAP4	HC at MAP5	HC at MAP6	HC at MAP7	HC at MAP8	HC at MAP9	HC at MAP10	HC at MAP11	HC at MAP12	HC at MAP13	HC at MAP14	HC at MAP15	HC at MAP16	HC at MAP17	HC at MAP18	HC at MAP19
7.5000E+2	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5265E+2	2.6000E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	7.0000E+2	7.3000E+2	7.6700E+2
1.4977E-1	1.5180E-1	1.6351E-1	1.9046E-1	2.2027E-1	2.4825E-1	2.7316E-1	2.9575E-1	3.1751E-1	3.3989E-1	3.6370E-1	3.8899E-1	4.1513E-1	4.4127E-1	4.6719E-1	4.9433E-1	5.2733E-1	5.7573E-1	6.8208E-1
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
7.3568E-5	4.7714E-4	1.2819E-3	1.8587E-3	1.9383E-3	1.7679E-3	1.5454E-3	1.4199E-3	1.4916E-3	1.8116E-3	2.3819E-3	3.1558E-3	4.0374E-3	4.8821E-3	5.4959E-3	5.6363E-3	5.0115E-3	3.2808E-3	-9.5936E-4
4.5599E-1	4.4363E-1	3.9879E-1	3.4649E-1	3.5280E-1	4.2648E-1	5.5153E-1	7.0087E-1	8.4695E-1	9.6910E-1	1.0579E+0	1.1161E+0	1.1570E+0	1.1991E+0	1.2575E+0	1.3332E+0	1.3978E+0	1.3764E+0	1.0120E+0
1.7960E-5	1.2323E-5	1.2357E-5	3.8808E-5	7.6812E-5	1.1148E-4	1.3496E-4	1.4494E-4	1.4309E-4	1.3359E-4	1.2158E-4	1.1165E-4	1.0631E-4	1.0451E-4	1.0007E-4	8.0187E-5	2.3931E-5	-9.9302E-5	-4.0663E-4
1.0000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5265E+2	2.6000E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	7.0000E+2	7.3000E+2	7.4317E+2
2.0733E-1	2.1844E-1	2.4487E-1	2.7776E-1	3.0715E-1	3.3633E-1	3.6696E-1	3.9946E-1	4.3344E-1	4.6808E-1	5.0257E-1	5.3654E-1	5.7041E-1	6.0590E-1	6.4634E-1	6.9718E-1	7.6631E-1	8.6456E-1	1.0471E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.5803E-3	1.8749E-3	2.5430E-3	3.2780E-3	3.8380E-3	4.3601E-3	4.9517E-3	5.6914E-3	6.6280E-3	7.7812E-3	9.1414E-3	1.0670E-2	1.2297E-2	1.3927E-2	1.5432E-2	1.6655E-2	1.7411E-2	1.7485E-2	1.6272E-2
6.3901E-1	7.1646E-1	8.7963E-1	1.0278E+0	1.1060E+0	1.1523E+0	1.1922E+0	1.2407E+0	1.3051E+0	1.3870E+0	1.4844E+0	1.5949E+0	1.7172E+0	1.8538E+0	2.0134E+0	2.2130E+0	2.4806E+0	2.8573E+0	3.5575E+0
1.1566E-4	1.2541E-4	1.4987E-4	1.8020E-4	2.0201E-4	2.1471E-4	2.1812E-4	2.1252E-4	1.9859E-4	1.7747E-4	1.5070E-4	1.2029E-4	8.8654E-5	5.8638E-5	3.3529E-5	1.7040E-5	1.3316E-5	2.6935E-5	7.5087E-5
1.2000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5600E+2	2.6000E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	7.0000E+2	7.3000E+2	7.6500E+2
2.1999E-1	2.3806E-1	2.8187E-1	3.3516E-1	3.7774E-1	4.1437E-1	4.4918E-1	4.8514E-1	5.2379E-1	5.6524E-1	6.0839E-1	6.5135E-1	6.9223E-1	7.2999E-1	7.6572E-1	8.0404E-1	8.5477E-1	9.3487E-1	1.1141E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
4.2964E-3	4.8147E-3	5.4803E-3	5.8387E-3	6.6236E-3	8.0964E-3	9.9338E-3	1.1707E-2	1.3197E-2	1.4538E-2	1.6205E-2	1.8822E-2	2.2815E-2	2.7890E-2	3.2354E-2	3.2257E-2	2.0383E-2	-1.4941E-2	-1.1735E-1
9.4823E-1	9.7201E-1	1.0234E+0	1.0862E+0	1.1537E+0	1.2366E+0	1.3363E+0	1.4509E+0	1.5789E+0	1.7210E+0	1.8802E+0	2.0599E+0	2.2606E+0	2.4740E+0	2.6758E+0	2.8168E+0	2.8115E+0	2.5254E+0	1.4851E+0
1.4327E-4	1.6082E-4	1.8133E-4	1.7478E-4	1.6143E-4	1.5860E-4	1.6650E-4	1.7737E-4	1.8241E-4	1.7627E-4	1.5928E-4	1.3733E-4	1.1947E-4	1.1312E-4	1.1701E-4	1.1176E-4	4.8221E-5	-1.6666E-4	-8.7416E-4

ตารางที่ ง2 (ต่อ) แสดงข้อมูลเครื่องยนต์ที่ใช้ป้อนเข้าโปรแกรมแบบจำลองที่ดัดแปลง

1.5000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5900E+2	2.6000E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	7.0000E+2	7.3000E+2	7.6700E+2
2.7033E-1	2.9699E-1	3.5626E-1	4.2074E-1	4.7086E-1	5.1723E-1	5.6523E-1	6.1653E-1	6.7038E-1	7.2482E-1	7.7770E-1	8.2755E-1	8.7430E-1	9.1984E-1	9.6844E-1	1.0270E+0	1.1051E+0	1.2151E+0	1.4167E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
7.5856E-3	7.7428E-3	7.6075E-3	7.4876E-3	8.7736E-3	1.1572E-2	1.5209E-2	1.8814E-2	2.1735E-2	2.3762E-2	2.5185E-2	2.6668E-2	2.8943E-2	3.2332E-2	3.6082E-2	3.7533E-2	3.1097E-2	1.0664E-3	-6.9952E-2
1.4152E+0	1.3758E+0	1.2855E+0	1.2329E+0	1.2990E+0	1.4673E+0	1.7000E+0	1.9558E+0	2.2018E+0	2.4212E+0	2.6155E+0	2.8012E+0	3.0023E+0	3.2368E+0	3.4986E+0	3.7342E+0	3.8144E+0	3.5002E+0	1.9797E+0
1.7537E-4	1.5976E-4	1.3449E-4	1.2622E-4	1.3401E-4	1.4610E-4	1.5777E-4	1.6782E-4	1.7607E-4	1.8191E-4	1.8379E-4	1.7974E-4	1.6892E-4	1.5413E-4	1.4530E-4	1.6409E-4	2.4936E-4	4.6371E-4	1.0486E-3

1.8000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5900E+2	2.6000E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	7.0000E+2	7.3000E+2	7.6600E+2
3.5322E-1	3.7651E-1	4.3793E-1	5.2177E-1	5.9436E-1	6.5773E-1	7.1574E-1	7.7252E-1	8.3132E-1	8.9380E-1	9.5990E-1	1.0280E+0	1.0960E+0	1.1619E+0	1.2262E+0	1.2937E+0	1.3762E+0	1.4955E+0	1.7480E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
9.6162E-3	9.0840E-3	9.2693E-3	1.2428E-2	1.7014E-2	2.1538E-2	2.5218E-2	2.7820E-2	2.9479E-2	3.0540E-2	3.1389E-2	3.2282E-2	3.3179E-2	3.3579E-2	3.2348E 2	2.7656E-2	1.6306E-2	-5.4326E-3	-5.4728E-2
1.0962E+0	1.2017E+0	1.4310E+0	1.6767E+0	1.8794E+0	2.0923E+0	2.3398E+0	2.6234E+0	2.9270E+0	3.2230E+0	3.4781E+0	3.6582E+0	3.7351E+0	3.6915E+0	3.5269E+0	3.2635E+0	2.9515E+0	2.6750E+0	2.5705E+0
9.2678E-5	8.2930E-5	7.2532E-5	8.0999E-5	9.7859E-5	1.1335E-4	1.2619E-4	1.3852E-4	1.5231E-4	1.6726E-4	1.8010E-4	1.8547E-4	1.7814E-4	1.5679E-4	1.2921E-4	1.1901E-4	1.7376E-4	3.7460E-4	1.0150E-3

2.1000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5800E+2	2.6000E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	7.0000E+2	7.3000E+2	7.6500E+2
4.2236E-1	4.3940E-1	4.8766E-1	5.6101E-1	6.3233E-1	7.0153E-1	7.7045E-1	8.4123E-1	9.1526E-1	9.9257E-1	1.0718E+0	1.1506E+0	1.2267E+0	1.2991E+0	1.3705E+0	1.4494E+0	1.5532E+0	1.7119E+0	2.0538E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
1.1060E-2	1.2619E-2	1.5682E-2	1.8143E-2	1.9509E-2	2.0926E-2	2.3067E-2	2.6210E-2	3.0317E-2	3.5113E-2	4.0160E-2	4.4939E-2	4.8926E-2	5.1672E-2	5.2878E-2	5.2476E-2	5.0704E-2	4.8188E-2	4.5722E-2
1.1907E+0	1.3252E+0	1.5937E+0	1.8139E+0	1.9302E+0	2.0374E+0	2.1960E+0	2.4374E+0	2.7673E+0	3.1710E+0	3.6171E+0	4.0624E+0	4.4559E+0	4.7433E+0	4.8717E+0	4.7934E+0	4.4709E+0	3.8808E+0	2.7795E+0
6.0757E-5	5.6644E-5	5.4485E-5	6.2657E-5	7.3163E-5	8.3420E-5	9.6185E-5	1.1489E-4	1.4060E-4	1.7057E-4	1.9840E-4	2.1585E-4	2.1623E-4	1.9944E-4	1.7854E-4	1.8805E-4	2.9378E-4	6.0430E-4	1.5193E-3

2.5000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5700E+2	2.6000E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	7.0000E+2	7.3000E+2	7.6800E+2
5.2653E-1	5.5291E-1	6.2391E-1	7.2678E-1	8.2473E-1	9.1881E-1	1.0108E+0	1.1024E+0	1.1944E+0	1.2868E+0	1.3789E+0	1.4695E+0	1.5579E+0	1.6450E+0	1.7350E+0	1.8367E+0	1.9663E+0	2.1495E+0	2.5073E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.0518E-2	2.0657E-2	2.2760E-2	2.6749E-2	2.8781E-2	2.8786E-2	2.8347E-2	2.9176E-2	3.2135E-2	3.6784E-2	4.1479E-2	4.4006E-2	4.2756E-2	3.8432E-2	3.6306E-2	4.9012E-2	9.9872E-2	2.2677E-1	5.7439E-1
1.6453E+0	1.7332E+0	2.0099E+0	2.4759E+0	2.9414E+0	3.3684E+0	3.7460E+0	4.0829E+0	4.3998E+0	4.7219E+0	5.0711E+0	5.4585E+0	5.8770E+0	6.2933E+0	6.6410E+0	6.8122E+0	6.6506E+0	5.9435E+0	3.9037E+0
6.6063E-5	6.6147E-5	7.3011E-5	9.1951E-5	1.1186E-4	1.2871E-4	1.4251E-4	1.5484E-4	1.6698E-4	1.7894E-4	1.8919E-4	1.9512E-4	1.9438E-4	1.8685E-4	1.7744E-4	1.7970E-4	2.2006E-4	3.4298E-4	7.1220E-4

ตารางที่ ง2 (ต่อ) แสดงข้อมูลเครื่องยนต์ที่ใช้ป้อนเข้าโปรแกรมแบบจำลองที่ดัดแปลง

3.0000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.6000E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	6.7810E+2	0.0000E+0	0.0000E+0	0.0000E+0
6.2262E-1	6.5321E-1	7.3643E-1	8.5925E-1	9.7778E-1	1.0917E+0	1.2019E+0	1.3104E+0	1.4195E+0	1.5316E+0	1.6482E+0	1.7699E+0	1.8959E+0	2.0231E+0	2.1458E+0	2.2554E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.0180E-2	1.9478E-2	1.9856E-2	2.3399E-2	2.7240E-2	2.9981E-2	3.1722E-2	3.3213E-2	3.5234E-2	3.8206E-2	4.2026E-2	4.6140E-2	4.9840E-2	5.2786E-2	5.5767E-2	6.1686E-2	0.0000E+0	0.0000E+0	0.0000E+0
1.8695E+0	2.0087E+0	2.3788E+0	2.9110E+0	3.4183E+0	3.9046E+0	4.3743E+0	4.8322E+0	5.2824E+0	5.7280E+0	6.1706E+0	6.6091E+0	7.0401E+0	7.4565E+0	7.8472E+0	8.1966E+0	0.0000E+0	0.0000E+0	0.0000E+0
8.0585E-5	6.2547E-5	5.3127E-5	9.0657E-5	1.3328E-4	1.5597E-4	1.5886E-4	1.5263E-4	1.4810E-4	1.5005E-4	1.5530E-4	1.5492E-4	1.4079E-4	1.1627E-4	1.1114E-4	2.0078E-4	0.0000E+0	0.0000E+0	0.0000E+0

3.5000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.5800E+2	2.6000E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	6.7610E+2	0.0000E+0	0.0000E+0
7.4868E-1	7.7857E-1	8.6065E-1	9.8569E-1	1.1129E+0	1.2419E+0	1.3726E+0	1.5047E+0	1.6379E+0	1.7721E+0	1.9071E+0	2.0425E+0	2.1781E+0	2.3137E+0	2.4492E+0	2.5841E+0	2.7184E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.2551E-2	2.5474E-2	3.1161E-2	3.5857E-2	3.8454E-2	4.0282E-2	4.1716E-2	4.2739E-2	4.3315E-2	4.3599E-2	4.3964E-2	4.4864E-2	4.6510E-2	4.8385E-2	4.8571E-2	4.2910E-2	2.3995E-2	0.0000E+0	0.0000E+0
2.4882E+0	2.5775E+0	2.8811E+0	3.4307E+0	4.0103E+0	4.5686E+0	5.0892E+0	5.5782E+0	6.0526E+0	6.5280E+0	7.0066E+0	7.4652E+0	7.8429E+0	8.0295E+0	7.8532E+0	7.0683E+0	5.3437E+0	0.0000E+0	0.0000E+0
5.5450E-5	7.3291E-5	9.5399E-5	1.0006E-4	1.1095E-4	1.4065E-4	1.8126E-4	2.1753E-4	2.3624E-4	2.3185E-4	2.0849E-4	1.7817E-4	1.5534E-4	1.4770E-4	1.4332E-4	9.4029E-5	-1.0491E-4	0.0000E+0	0.0000E+0

4.0000E+3	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
2.7170E+2	2.8000E+2	3.1000E+2	3.4000E+2	3.7000E+2	4.0000E+2	4.3000E+2	4.6000E+2	4.9000E+2	5.2000E+2	5.5000E+2	5.8000E+2	6.1000E+2	6.4000E+2	6.7000E+2	6.7910E+2	0.0000E+0	0.0000E+0	0.0000E+0
8.5495E-1	9.0791E-1	1.0339E+0	1.1906E+0	1.3302E+0	1.4675E+0	1.6097E+0	1.7580E+0	1.9099E+0	2.0616E+0	2.2099E+0	2.3547E+0	2.5009E+0	2.6606E+0	2.8556E+0	3.1192E+0	0.0000E+0	0.0000E+0	0.0000E+0
0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0	0.0000E+0
4.0743E-2	3.7508E-2	3.6998E-2	4.1740E-2	4.0691E-2	3.4084E-2	2.8245E-2	2.8568E-2	3.5717E-2	4.5047E-2	4.9238E-2	4.4149E-2	3.7897E-2	6.3141E-2	1.9260E-1	5.5778E-1	0.0000E+0	0.0000E+0	0.0000E+0
3.0242E+0	3.2230E+0	3.7281E+0	4.4070E+0	5.0208E+0	5.5982E+0	6.1617E+0	6.7276E+0	7.3046E+0	7.8934E+0	8.4861E+0	9.0652E+0	9.6029E+0	1.0061E+1	1.0388E+1	1.0523E+1	0.0000E+0	0.0000E+0	0.0000E+0
5.4438E-5	5.0625E-5	4.1716E-5	3.2380E-5	2.7875E-5	2.8202E-5	3.3361E-5	4.3351E-5	5.8173E-5	7.7828E-5	1.0231E-4	1.3163E-4	1.6578E-4	2.0476E-4	2.4857E-4	2.9722E-4	0.0000E+0	0.0000E+0	0.0000E+0

ภาคผนวก จ

โปรแกรมแบบจำลอง

ภาคผนวก จ1 โปรแกรมแบบจำลองการสิ้นเปลืองเชื้อเพลิงและมลภาวะจากรถยนต์ (V.F.C.E. Model)

```
C*********************************************************************
C               MAIN PROGRAM (SIMULATION MODEL)
C*********************************************************************
C
      IMPLICIT REAL*8 (A-H,O-Z)
C
C*********************************************************************
C
C**** CALL CONDITION OF MODELING ************************************
C
      CALL ASSUMPTION
C
C**** CALL SUBROUTINE CALCULATE ENGINE TORQUE AND REVOLUTIONS AT TIME**
C
      WRITE(*,10)
   10 FORMAT(/,'  CALCULATE ENGINE REVOLUTIONS AND TORQUE AT TIME')
C
      CALL CAL_TE_NE(NTIME,dist)
C
C**** ESTIMATE COEFFICIENT C0,C1,C2 OF PLANE(G=C0+C1*X1+C2*X2) ********
C
      WRITE(*,20)
   20 FORMAT(/,'  FIND 4 COORDINATES AROUND POINT EACH TIME')
C
      CALL COORDINATE(NTIME)
C
      WRITE(*,30)
   30 FORMAT(/,' CALCULATE FUEL CONSUMPTION AND EMISSIONS AT EACH TIME')
C
      CALL MLREGRESS(NTIME)
C
C**** CALCULATE FUEL CONSUMPTION AND EMISSIONS OF CAR AT TIME *********
C**** AND SUMMATION FC AND EMISSIONS ALL TIME ************************
C
      WRITE(*,40)
   40 FORMAT(/,'  SUM FUEL CONSUMPTION AND EMISSIONS ')
C
      CALL CAL_SUM(NTIME,dist)
C
      STOP
      END
C
C*********************************************************************
C                          END MAIN PROGRAM
C*********************************************************************
C
C
C*********************************************************************
C                     ASSUMPTION OF MODELING
C*********************************************************************
C
      SUBROUTINE ASSUMPTION
C
      CHARACTER*4 TXT
C
```

```
      WRITE(*,100)
  100 FORMAT(/,'     THE ASSUMTION OF MODELING')
      WRITE(*,200)
  200 FORMAT(/,' 1......')
      WRITE(*,300)
  300 FORMAT(/,' 2......')
      WRITE(*,1000)
 1000 FORMAT(/,'     DO YOU WANT TO CONTINUE ? (Y or N)')
      READ(*,10) TXT
   10 FORMAT(A4)
C
      IF(TXT .EQ. 'Y' .OR. TXT .EQ. 'y') THEN
        GO TO 20
      ELSE
        STOP
      ENDIF
C
   20 RETURN
      END
C
C**********************************************************************
C          CALCULATE ENGINE TORQUE AND REVOLUTIONS ALL TIME
C**********************************************************************
C
      SUBROUTINE CAL_TE_NE(NTIME,dist)
C
      CHARACTER *7 GR1,GR2,GR3
      REAL*8 K,FR,MASS,IMASS,NE,dist
C
C**** OPEN CHARACTERISTICS OF CAR ************************************
C
      OPEN(UNIT=1,FILE='PARA.DAT',STATUS='OLD')
C
      READ(1,*) K,FR,MASS,imass,RW,GT1,GT2,GT3,GT4,GT5,GD,EFFT
C
C*****OPEN DRIVING PATTERN OF CAR ************************************
C
      OPEN(UNIT=2,FILE='DRIVING.DAT',STATUS='OLD')
C
C**** COUNT TOTAL TIME OF DRIVING PATTERN *****************************
C
      READ(2,150) TEXT

C
      DO 5 N = 1,9999
      READ(2,200) IA,V1,GR1
C
        IF(IA .EQ. 9999) THEN
          NTIME = IA1-1
          GO TO 10
        ELSE
          IA1 = IA
        ENDIF
C
    5 CONTINUE
```

```
C
   10 CLOSE(2)
C
C**** OPEN DRIVING PATTERN ***********************************************
C
      OPEN(UNIT=2,FILE='DRIVING.DAT',STATUS='OLD')
C

      READ(2,150) TEXT
  150 FORMAT(20A4)
      READ(2,200) IA,V1,GR1
      READ(2,200) IA,V2,GR2
C
C************************** PI VALUE ***********************************
C
      PI=3.141592653
C
C***********************************************************************
C
      DO 100 LOOP = 1,NTIME
      READ(2,200) IA,V3,GR3
C
C**** CALCULATE DISTANCE OF DRIVING PATTERN ***************************
C
      IF (LOOP .EQ. 1) THEN
        dist = 0.
        dist = V2*1.0/1000.
      ELSE
        dist = dist+V2*1.0/1000.
      ENDIF
C
        IF(IA .EQ. (LOOP+1)) THEN
            GO TO 20
        ELSE
            WRITE(*,30)
        STOP
   30 FORMAT(/,'!!!!! PLEASE CHECK YOUR INPUT FILE: DRIVING.DAT !!!!!')
        ENDIF
C
  200 FORMAT(7X,I4,F10.3,A7)
C
C*****  CONDITION OF DRIVING *****************************************
C
   20 CALL COND_DRIVING(GR2,GT1,GT2,GT3,GT4,GT5,GD,G)
C
C*****CALCULATE THE ACCERELATION OF CAR: ******************************
C
               AT = (V3-V1)/2.
C
C****************** COLLECT DATA "AT" TO FILE 'ACCE.OUT' **************
C
      OPEN(UNIT=12,FILE='ACCE.OUT',STATUS='NEW')
C
      IF(LOOP .GT. 1) GOTO 480
      WRITE(12,450)
```

```
  450 FORMAT(T5,'TIME(SEC)   ACCERELATION(M/S2)')

  480 WRITE(12,400) LOOP,AT
  400 FORMAT(8X,I4,5X,F10.3)
C
C*********************************************************************
C
            F = (K*V2**2)+FR*MASS*9.806+0.+(IMASS*AT)
C
C***************** COLLECT DATA "IMASS,F" TO FILE 'IMASS_F.OUT' *******
C
      OPEN(UNIT=13,FILE='IMASS_F.OUT',STATUS='NEW')
C
      IF(LOOP .GT. 1) GOTO 580
      WRITE(13,550)
  550 FORMAT(T5,'TIME(SEC)  MASS(KG)  IMASS(KG)  FORCE(N) ')
  580 WRITE(13,500) LOOP,MASS,IMASS,F
  500 FORMAT(8X,I4,3F11.2)
C
C*********************************************************************
C
C***************** CALCULATE ENGINE TORQUE AND REVOLUTIONS ************
C
C*****CALCULATE ENGINE REVOLUTIONS: *********************************
C
               NE = (60.*G*V2)/(2.*PI*RW)
C
C**** SET IDLE SPEED OF CAR ***************************************
C
      IF (NE .LE. 750) NE = 750.
C
C*****CALCULATE ENGINE TORQUE: *************************************
C
               TE = (60.*F*V2)/(2.*PI*NE*EFFT)
C
C**** ASSUMPTION: WHEN CHANGE GEAR, IDLE SPEED AND NO LOAD ************
C
      IF(GR2.EQ.'   CHNG') TE = 0.
C
               IF(LOOP.GT.1) GO TO 75
C
C************ COLLECT DATA (NE,TE) TO "NE_TE.OUT" FILE ***************
C
      OPEN(UNIT=3,FILE='NE_TE.OUT',STATUS='NEW')
C
      WRITE(3,70)
      WRITE(*,70)
   70 FORMAT(' TIME(SEC)',4X,'ENGINE REV.(RPM)',4X,
     *'ENGINE TORQUE(N.M)')
   75 WRITE(3,80) LOOP,NE,TE
      WRITE(*,80) LOOP,NE,TE
   80 FORMAT(3X,I4,10X,F10.2,7X,F10.2)
      V1 = V2
      V2 = V3
      GR1 = GR2
```

```
      GR2 = GR3
  100 CONTINUE
C
      CLOSE(3)
      CLOSE(12)
C
C******* LOOKUP MINIMUM ENGINE TORQUE EACH ENGINE REVOLUTIONS ********
C******* FROM ENGINE MAP (MAP.DAT) ***********************************
C
      WRITE(*,300)
  300 FORMAT(/,'  COMPUTE MINIMUM TORQUE AT EACH SPEED')
C
      CALL MINIMUM_TORQUE(NTIME)
C
      CLOSE(1)
      CLOSE(2)
      RETURN
      END
C
C*************************************************************************
C
      SUBROUTINE COND_DRIVING(GR2,GT1,GT2,GT3,GT4,GT5,GD,G)
C
      CHARACTER*7 GR2
C
C******************************** FIRST GEAR ***************************
C
      IF(GR2.EQ.'   GEA1') G=GT1*GD
C
C******************************** SECOND GEAR **************************
C
      IF(GR2.EQ.'   GEA2') G=GT2*GD
C
C******************************** THIRD GEAR ***************************
C
      IF(GR2.EQ.'   GEA3') G=GT3*GD
C
C******************************** FOURTH GEAR **************************
C
      IF(GR2.EQ.'   GEA4') G=GT4*GD
C
C******************************** FIFTH GEAR ***************************
C
      IF(GR2.EQ.'   GEA5') G=GT5*GD
C
C******************************** GEAR CHANGE **************************
C
      IF(GR2.EQ.'   CHNG') G=0.
C
C******************************** IDLE GEAR ****************************
C
      IF(GR2.EQ.'   IDLE') G=0.
C
      RETURN
      END
```

```
C
C*************************************************************************
C
      SUBROUTINE MINIMUM_TORQUE(NTIME)
C
      DIMENSION ROW(20),COL(20)
      REAL*8 NE
C
***************** OPEN OLD FILES ************************************
C
      OPEN(UNIT=3,FILE='NE_TE.OUT',STATUS='OLD')
      OPEN(UNIT=4,FILE='MAP.DAT',STATUS='OLD',
     *ACCESS='DIRECT',FORM='FORMATTED',RECL=190)
C
C**************** OPEN NEW FILE TO COLLECT NE AND TE THAT ************
C**************** FOLLOW ASSUMPTION **********************************
C
      OPEN(UNIT=11,FILE='NE_TE_R.OUT',STATUS='NEW')
C
      WRITE(11,70)
      WRITE(*,70)
   70 FORMAT(' TIME(SEC)',4X,'ENGINE REV.(RPM)',4X,
     *'ENGINE TORQUE(N.M)')
      READ(3,75) TEXT
   75 FORMAT(20A4)
C
      DO 100 LOOP = 1,NTIME
      READ(3,*) II,NE,TE
C
C**************** READ ENGINE SPEED ALL OF ENGINE MAP ****************
C
      I0 = 1
  300 K1 = (I0-1)*8+1
      READ(4,310,END=320,REC=K1) COL(I0)
  310 FORMAT(E10.4)
      I0 = I0+1
      GO TO 300
C
  320 I1 = 0
  325 I1 = I1+1
      IF (NE.GE.COL(I1)) GO TO 325
      K2 = (I1-1)*8-8+2
C
C**************** READ MINIMUM TORQUE AT THIS SPEED FROM MAP *********
C
      READ(4,326,END=330,REC=K2) ROW(1)
  326 FORMAT(E10.4)
C
C**************** ASSUMPTION:IF CALCULATED TORQUE LOWER THEN *********
C**************** MINIMUM TORQUE AT THIS SPEED THAT USE **************
C**************** MINIMUM TORQUE OBTAINS *****************************
C
  330 IF (TE.LE.ROW(1)) THEN
      TE = ROW(1)
      ENDIF
```

```
C
C*************** COLLECT NE AND NEW TE TO 'NE_TE_R.OUT' *************
C
      WRITE(11,80) LOOP,NE,TE
      WRITE(*,80) LOOP,NE,TE
   80 FORMAT(3X,I4,10X,F10.2,7X,F10.2)
  100 CONTINUE
C
      CLOSE(3)
      CLOSE(4)
      CLOSE(11)
      RETURN
      END
C
C*********************************************************************
C
      SUBROUTINE COORDINATE(NTIME)
C
      DIMENSION ROW(20),ROWG(20),X(4),Y(4),G(4),COL(20)
      REAL*8 NE
C
      OPEN(UNIT=11,FILE='NE_TE_R.OUT',STATUS='OLD')
      OPEN(UNIT=4,FILE='MAP.DAT',STATUS='OLD',
     *ACCESS='DIRECT',form='formatted',recl=190)
C
      READ(11,20) TEXT
   20 FORMAT(20A4)
C
      OPEN(UNIT=7,FILE='COORD.OUT',STATUS='NEW')
C
      DO 100 LOOP = 1,NTIME
      WRITE(7,50) LOOP
      WRITE(*,50) LOOP
   50 FORMAT(2X,I4)
      READ(11,*) II,NE,TE
      DO 200 J = 1,6
C
C*************** READ ENGINE SPEEDS OF MAP ************************
C
      I0 = 1
  300 K1 = (I0-1)*8+1
      READ(4,310,END=320,REC=K1) COL(I0)
  310 FORMAT(E10.4)
      I0 = I0+1
      GO TO 300
C
C*********************************************************************
C
C     Y OR ENGINE TORQUE
C       |  G4(X4,Y4)
C       |   *                 * G3(X3,Y3)
C       |   :                 :
C       |   :    +G(NE,TE)    :
C       |   :                 :
C       |   :                 * G2(X2,Y2)
```

```
C      |   :                :
C      |   * G1(X1,Y1)      :
C     0,0 :- -- -- -- -- -- :-- -- -- -- -- X OR ENGINE SPEED
C
C**************************************************************************
C
C**************** COMPARE AT TIME SPEED WITH ENGINE SPEED OF MAP *****
C**************** TO FIND SPEEDS AROUND AT TIME SPEED ****************
C
  320 I1 = 0
      NROW = 19
  325 I1 = I1+1
      IF (NE.GE.COL(I1)) GO TO 325
           X(1) = COL(I1-1)
           X(2) = COL(I1)
           X(3) = COL(I1)
           X(4) = COL(I1-1)
C
C**************** READ ENGINE TORQUES AT SPEED COL(I1-1) *************
C
      K2 = (I1-1)*8-8+2
      READ(4,326,END=330,REC=K2) (ROW(I),I=1,NROW)
  330 I2 = 0
  327 I2 = I2+1
C
C**************** FIND ENGINE TORQUE AT POINT 1 AND 4 ****************
C
      IF(TE.GE.ROW(I2)) GO TO 327
          Y(4) = ROW(I2)
          Y(1) = ROW(I2-1)
      IF (TE .LT. ROW(1)) THEN
                Y(1) = ROW(1)
                Y(4) = ROW(2)
      ENDIF
C
C**************** READ FC OR EMISSIONS AT SPEED COL(I1-1) ************
C
      K3 = (I1-1)*8-8+2+J
      READ(4,326,END=350,REC=K3) (ROWG(I),I=1,NROW)
  350 I3 = 0
  355 I3 = I3+1
C
C**************** FIND FC OR EMISSIONS AT POINT 1 AND 4 **************
C
      IF (TE.GE.ROW(I3)) GO TO 355
           G(4) = ROWG(I3)
           G(1) = ROWG(I3-1)
      IF (TE .LT. ROW(1)) THEN
           G(1) = ROWG(1)
           G(4) = ROWG(2)
      ENDIF
C
C**************** READ ENGINE TORQUE AT SPEED COL(I1) ****************
C
      K4 = (I1)*8-8+2
```

```
      READ(4,326,END=360,REC=K4) (ROW(I),I=1,NROW)
  360 I4 = 0
  370 I4 = I4+1
C
C**************** FIND ENGINE TORQUE AT POINT 2 AND 3 ****************
C
      IF(TE .GE. ROW(I4)) GO TO 370
          Y(3) = ROW(I4)
          Y(2) = ROW(I4-1)
      IF(TE .LT. ROW(1)) THEN
                Y(2) = ROW(1)
                Y(3) = ROW(2)
      ENDIF
C
C**************** READ FC OR EMISSIONS AT SPEED COL(I1) **************
C
      K5 = (I1)*8-8+2+J
      READ(4,326,END=380,REC=K5) (ROWG(I),I=1,NROW)
  380 I5 = 0
  385 I5 = I5+1
C
C**************** FIND FC OR EMISSIONS AT POINT 2 AND 3 **************
C
      IF (TE .GE. ROW(I5)) GO TO 385
          G(3)=ROWG(I5)
          G(2)=ROWG(I5-1)
      IF (TE .LT. ROW(1)) THEN
                G(2) = ROWG(1)
                G(3) = ROWG(2)
      ENDIF
C
C**** COLLECT DATA TO 'COORD.OUT'*************************************
C
      DO 356 IN = 1,4
      WRITE(7,*) X(IN),Y(IN),G(IN)
      WRITE(*,*) X(IN),Y(IN),G(IN)
  356 CONTINUE
C
      WRITE(7,390)
      WRITE(*,390)
  390 FORMAT('-------------------------------------------------')
  326 FORMAT(19E10.4)
  200 CONTINUE
  100 CONTINUE
C
      CLOSE(11)
      CLOSE(4)
      CLOSE(7)
      RETURN
      END
C
C***********************************************************************
C
      SUBROUTINE MLREGRESS(NTIME)
C
```

```
      DIMENSION A(10,10),B(10),C(10)
      DIMENSION X(4,2),G(4)
      K = 2
      N = 4
C
      OPEN(UNIT=7,FILE='COORD.OUT',STATUS='OLD')
      OPEN(UNIT=8,FILE='COEFFIC.OUT',STATUS='NEW')
C
      DO 100 LOOP = 1,NTIME
      READ(7,*) NLOOP
      WRITE(8,50) LOOP
      WRITE(*,50) LOOP
   50 FORMAT(2X,I4,4X,'C0',14X,'C1',12X,'C2')
C
      DO 200 J = 1,6
C
      DO 300 I = 1,N
      READ(7,*) (X(I,L),L =1,K),G(I)
  300 CONTINUE
C
      READ(7,350) TEXT
  350 FORMAT(20A4)
C
      DO 400 IR = 1,3
      B(IR) = 0.
      DO 400 IC = 1,3
      A(IR,IC) = 0.
  400 CONTINUE
C
C*****COMPUTE SQURE MATRIX ON LHS AND
C*****VECTOR ON RHS OF SYSTEM EQUATIONS:
C*****CALL SUBROUTINE FOR SOLVING SYSTEM EQS:
C
      DO 500 I = 1,N
C
      DO 600 IR = 1,K+1
      IF (IR .EQ. 1) FR = 1.
      IF (IR .GT. 1) FR = X(I,IR-1)
C
      DO 700 IC = 1,K+1
      IF (IC .EQ. 1) FC = 1.
      IF (IC .GT. 1) FC = X(I,IC-1)
      A(IR,IC) = A(IR,IC)+FR*FC
  700 CONTINUE
C
      B(IR) = B(IR)+FR*G(I)
  600 CONTINUE
  500 CONTINUE
C
      KP1 = K+1
C
      CALL GAUSS(KP1,A,B,C)
C
C**** COLLECT COEFFICIENTS TO 'COEFFIC.OUT' ************************
C
```

```
      WRITE(8,80) C(1),C(2),C(3)
      WRITE(*,80) C(1),C(2),C(3)
   80 FORMAT(3E15.4)
  200 CONTINUE
  100 CONTINUE
C
      CLOSE(7)
      CLOSE(8)
      RETURN
      END
C
C*********************************************************************
C
      SUBROUTINE GAUSS(N,A,B,X)
C
      DIMENSION A(10,10),B(10),X(10)
C
C*****PERFORM SCALING:
C
      CALL SCALE(N,A,B)
C
C*****FORWARD ELIMINATION: PERFORM ACCORDING TO
C*****THE ORDER OF 'PRIME' FROM 1 TO N-1:
C
      DO 100 IP = 1,N-1
C
C*****PERFORM PARTIAL PIVOTING:
C
      CALL PIVOT(N,A,B,IP)
C
C*****LOOP OVER EACH EQUATION STARTING FROM THE
C*****ONE THAT CORRESPONDS WITH THE ORDER OF
C*****'PRIME' PLUS ONE:
C
      DO 200 IE = IP+1,N
      RATIO = A(IE,IP)/A(IP,IP)
C
C*****COMPUTE NEW COEFF. OF THE EQ. CONSIDERED:
C
      DO 300 IC = IP+1,N
      A(IE,IC) = A(IE,IC)-RATIO*A(IP,IC)
  300 CONTINUE
C
      B(IE) = B(IE)-RATIO*B(IP)
  200 CONTINUE
C
C*****SET COEFF. ON LOWER LEFT PORTION TO ZERO:
C
      DO 400 IE = IP+1,N
      A(IE,IP) = 0.
  400 CONTINUE
  100 CONTINUE
C
C*****BACK SUBSTITUTION:
C*****COMPUTE SOLUTION OF THE LAST EQUATION:
```

```
C
      X(N) = B(N)/A(N,N)
C
C*****COMPUTE SOLUTIONS FROM EQUATION N-1 TO 1:
C
      DO 500 IE = N-1,1,-1
      SM = 0.
C
      DO 600 IC = IE+1,N
      SM = SM+A(IE,IC)*X(IC)
  600 CONTINUE
C
      X(IE) = (B(IE)-SM)/A(IE,IE)
  500 CONTINUE
C
      RETURN
      END
C
C**********************************************************************
C
      SUBROUTINE SCALE(N,A,B)
C
      DIMENSION A(10,10),B(10)
C
C*****PERFORM SCALING:
C
      DO 10 IE = 1,N
      BIG = ABS(A(IE,1))
C
      DO 20 IC = 2,N
      AMAX = ABS(A(IE,IC))
      IF (AMAX.GT.BIG) BIG = AMAX
   20 CONTINUE
C
      DO 30 IC = 1,N
      A(IE,IC) = A(IE,IC)/BIG
   30 CONTINUE
C
      B(IE) = B(IE)/BIG
   10 CONTINUE
C
      RETURN
      END
C
C**********************************************************************
C
      SUBROUTINE PIVOT(N,A,B,IP)
C
      DIMENSION A(10,10),B(10)
C
C*****PERFORM PARTIAL PIVOTING:
C
      JP = IP
      BIG = ABS(A(IP,IP))
C
```

```
      DO 10 I = IP+1,N
      AMAX = ABS(A(I,IP))
      IF (AMAX.GT.BIG) THEN
            BIG = AMAX
            JP = I
      ENDIF
   10 CONTINUE
C
            IF (JP .NE. IP) THEN
C
      DO 20 J = IP,N
      DUMY    = A(JP,J)
      A(JP,J) = A(IP,J)
      A(IP,J) = DUMY
   20 CONTINUE
C
      DUMY = B(JP)
      B(JP)= B(IP)
      B(IP)= DUMY
            ENDIF
      RETURN
      END
C
C*********************************************************************
C
      SUBROUTINE CAL_SUM(NTIME,dist)
C
      DIMENSION SUM(6),GX(6),T(6)
      REAL*8 NE,dist
C
      OPEN(UNIT=11,FILE='NE_TE_R.OUT',STATUS='OLD')
      OPEN(UNIT=8,FILE='COEFFIC.OUT',STATUS='OLD')
      OPEN(UNIT=4,FILE='MAP.DAT',STATUS='OLD',
     *ACCESS='DIRECT',FORM='FORMATTED',RECL=190)
      OPEN(UNIT=9,FILE='FC_EMM.OUT',STATUS='NEW')
      OPEN(UNIT=3,FILE='NE_TE.OUT',STATUS='OLD')
C
      WRITE(9,20)
      WRITE(*,20)
   20 FORMAT(2X,'TIME',4X,'FC',10X,'NOX',10X,'CO',10X,'CO2',10X,'HC'
     *       5X,'MAP')
      WRITE(9,21)
   21 FORMAT(2X,'(SEC)',2X,'(G/S)',8X,'(G/S)',8X,'(G/S)',8X,'(G/S)'
     *       ,8X,'(G/S)',3X,'(kPa)')
      READ(11,50) TEXT
      READ(3,50) TEXT
C
      DO 100 LOOP = 1,NTIME
      READ(11,*) I,NE,TE
      READ(8,50) TEXT
   40 FORMAT(7X,I4,F10.3,A7)
   50 FORMAT(20A4)
      READ(3,55) ILOOP,XNE,TORQUE
   55 FORMAT(3X,I4,10X,F10.2,7X,F10.2)
C
```

```
      DO 200 J = 1,6
      READ(8,*) C0,C1,C2
C
C**** CALCULATE FUEL CONSUMPTION AND EMISSION OF CAR AT TIME **********
C
  450 GX(J) = (C0+C1*NE+C2*TE)
C
  200 CONTINUE
C
C**** IF ENGINE TORQUE OF ENGINE IS MINUS, FC AND EMISSIONS IS ZERO ***
C
      IF(TORQUE .LT. 0.) THEN
        GX(1)=0.
        GX(2)=0.
        GX(3)=0.
        GX(4)=0.
        GX(5)=0.
      ENDIF
C
      WRITE(9,70) LOOP,(GX(L),L=1,6)
      WRITE(*,70) LOOP,(GX(L),L=1,6)
   70 FORMAT(1X,I4,6E10.4)
C
C**** SUM FC AND EMISSIONS ALL TIME ***********************************
C
      CALL TOTAL(LOOP,GX,SUM)
C
  100 CONTINUE
C
      DO 300 JJ = 1,6
      T(JJ) = 0.
      T(JJ) = SUM(JJ)
  300 CONTINUE
C
      CALL PRINTOUT(T,NTIME,dist)
C
      CLOSE(11)
      CLOSE(8)
      CLOSE(4)
      CLOSE(9)
      CLOSE(3)
      RETURN
      END
C
C*************************************************************************
C
      SUBROUTINE TOTAL(LOOP,GX,SUM)
C
      DIMENSION GX(6),SUM(6)
C
      DO 100 J = 1,6
      IF (LOOP .EQ. 1) THEN
               SUM(J) = 0.
               SUM(J) = SUM(J)+GX(J)
      ELSE
```

```
                SUM(J) = SUM(J)+GX(J)
      ENDIF
  100 CONTINUE
C
      RETURN
      END
C
C*********************************************************************
C
      SUBROUTINE PRINTOUT(T,NTIME,dist)
C
      real*8 dist
      DIMENSION T(5),TKM(5)
C
      OPEN(UNIT=10,FILE='RESULT.OUT',STATUS='NEW')
C
      WRITE(10,920)
      WRITE(*,920)
  920 FORMAT(/)
C
      WRITE(10,925) NTIME
      WRITE(*,925) NTIME
  925 FORMAT(T3,'TOTAL TIME OF THIS TEST      :     ',I6,' SEC. ')
C
      WRITE(10,927) dist
      WRITE(*,927) dist
  927 FORMAT(T3,'DISTANCE OF CAR ON THIS TEST : ',F10.3,' KM. ')
C
      TKM(1) = T(1)/dist
C
      WRITE(10,930) TKM(1)
      WRITE(*,930) TKM(1)
  930 FORMAT(T3,'FUEL CONSUMPTION OF CAR      : ',E15.6,' (G/KM.) ')
C
      TT = TKM(1)/747.8
      TTT = 1./TT
C
      WRITE(10,910) TT
      WRITE(*,910) TT
  910 FORMAT(T3,'FUEL CONSUMPTION OF CAR      : ',E15.6,' (L/KM.) ')
C
      WRITE(10,915) TTT
      WRITE(*,915) TTT
  915 FORMAT(T3,'FUEL CONSUMPTION OF CAR      : ',F15.3,' (KM/L) ')
C
      WRITE(10,940)
      WRITE(*,940)
  940 FORMAT(T3,'EMISSSIONS (G/KM)')
C
      TKM(2) = T(2)/dist
C
      WRITE(10,950) TKM(2)
      WRITE(*,950) TKM(2)
  950 FORMAT(T6,'NOX :  ',E15.6)
C
```

```
      TKM(3) = T(3)/dist
C
      WRITE(10,960) TKM(3)
      WRITE(*,960) TKM(3)
  960 FORMAT(T6,' CO :  ',E15.6)
C
      TKM(4) = T(4)/dist
C
      WRITE(10,970) TKM(4)
      WRITE(*,970) TKM(4)
  970 FORMAT(T6,'CO2 :  ',E15.6)
C
      TKM(5) = T(5)/dist
C
      WRITE(10,980) TKM(5)
      WRITE(*,980) TKM(5)
  980 FORMAT(T6,' HC :  ',E15.6)
C
      WRITE(10,990)
      WRITE(*,990)
  990 FORMAT(' THANK  YOU ')
C
      CLOSE(10)
      RETURN
      END
C
C*********************************************************************
C
```

ภาคผนวก จ2 โปรแกรมแบบจำลองที่ถูกดัดแปลง

```
C*************************************************************************
C                  MAIN PROGRAM (EXPERIMENT MODEL)
C*************************************************************************
C
      IMPLICIT REAL*8 (A-H,O-Z)
C
C*************************************************************************
C
      CALL ASSUMPTION
C
      CALL COUNT_TIME(NTIME)
C
C**** ESTIMATE COEFFICIENT C0,C1,C2 OF PLANE(G=C0+C1*X1+C2*X2) ********
C
      WRITE(*,20)
   20 FORMAT(/,'  FIND 4 COORDINATES AROUND POINT EACH TIME')
C
      CALL COORDINATE(NTIME)
C
      WRITE(*,30)
   30 FORMAT(/,' CALCULATE FUEL CONSUMPTION AND EMISSIONS AT EACH TIME')
C
      CALL MLREGRESS(NTIME)
C
C**** CALCULATE FUEL CONSUMPTION AND EMISSIONS OF CAR AT TIME *********
C**** AND SUMMATION FC AND EMISSIONS ALL TIME **************************
C
      WRITE(*,40)
   40 FORMAT(/,'  SUM FUEL CONSUMPTION AND EMISSIONS ')
C
      CALL CAL_SUM(NTIME)
C
      STOP
      END
C
C*************************************************************************
C                          END MAIN PROGRAM
C*************************************************************************
C
C*************************************************************************
C                       ASSUMPTION OF MODELING
C*************************************************************************
C
      SUBROUTINE ASSUMPTION
C
      CHARACTER*4 TXT
C
      WRITE(*,100)
  100 FORMAT(/,'     THE ASSUMTION OF MODELING')
      WRITE(*,200)
  200 FORMAT(/,' 1.....')
      WRITE(*,300)
  300 FORMAT(/,' 2.....')
      WRITE(*,1000)
 1000 FORMAT(/,'     DO YOU WANT TO CONTINUE ? (Y or N)')
```

```
      READ(*,10) TXT
   10 FORMAT(A4)
C
      IF(TXT .EQ. 'Y' .OR. TXT .EQ. 'y') THEN
        GO TO 20
      ELSE
        STOP
      ENDIF
C
   20 RETURN
      END
C
C*************************************************************************
C
      SUBROUTINE COUNT_TIME(NTIME)
      REAL*8 NE,MP
C
C**** COUNT TOTAL TIME OF DRIVING PATTERN ****************************
C
      OPEN(UNIT=11,FILE='NE_MP.dat',STATUS='OLD')
C
      READ(11,150) TEXT
  150 FORMAT(30A4)
C
      DO 5 N = 1,9999
      READ(11,*) IA,NE,MP
C
        IF(IA .EQ. 9999) THEN
           NTIME = IA1-1
           GO TO 10
        ELSE
           IA1 = IA
        ENDIF
C
    5 CONTINUE
C
   10 CLOSE(11)
C
      RETURN
      END
C
C*************************************************************************
C
      SUBROUTINE COORDINATE(NTIME)
C
      DIMENSION ROW(20),ROWG(20),X(4),Y(4),G(4),COL(20)
      REAL*8 NE,MP
C
      OPEN(UNIT=11,FILE='NE_MP.dat',STATUS='OLD')
      OPEN(UNIT=4,FILE='MAP.DAT',STATUS='OLD',
     *ACCESS='DIRECT',form='formatted',recl=190)
C
      READ(11,20) TEXT
   20 FORMAT(30A4)
C
```

```
      OPEN(UNIT=7,FILE='COORD.OUT',STATUS='NEW')
C
      DO 100 LOOP = 1,NTIME
      WRITE(7,50) LOOP
      WRITE(*,50) LOOP
   50 FORMAT(2X,I4)
      READ(11,*) II,NE,MP
      DO 200 J = 1,5
C
C**************** READ ENGINE SPEEDS OF MAP ***************************
C
      I0 = 1
  300 K1 = (I0-1)*7+1
      READ(4,310,END=320,REC=K1) COL(I0)
  310 FORMAT(E10.4)
      I0 = I0+1
      GO TO 300
C
C**********************************************************************
C
C     Y OR PRESSURE
C       |  G4(X4,Y4)
C       |   *                * G3(X3,Y3)
C       |   :                :
C       |   :    +G(NE,TE)   :
C       |   :                :
C       |   :                * G2(X2,Y2)
C       |   :                :
C       |   * G1(X1,Y1)      :
C     0,0 :- -- -- -- -- -- :-- -- -- -- -- X OR ENGINE SPEED
C
C**********************************************************************
C
C**************** COMPARE AT TIME SPEED WITH ENGINE SPEED OF MAP *****
C**************** TO FIND SPEEDS AROUND AT TIME SPEED ****************
C
  320 I1 = 0
      NROW = 19
  325 I1 = I1+1
      IF (NE.GE.COL(I1)) GO TO 325
           X(1) = COL(I1-1)
           X(2) = COL(I1)
           X(3) = COL(I1)
           X(4) = COL(I1-1)
C
C**************** READ MANIFOLD PRESSURE AT SPEED COL(I1-1) **********
C
      K2 = (I1-1)*7-7+2
      READ(4,326,END=330,REC=K2) (ROW(I),I=1,NROW)
  326 FORMAT(19E10.4)
  330 I2 = 0
  327 I2 = I2+1
C
C**************** FIND MANIFOLD PRESSURE AT POINT 1 AND 4 ************
C
```

```
      IF(MP.GE.ROW(I2)) GO TO 327
          Y(4) = ROW(I2)
          Y(1) = ROW(I2-1)
      IF (MP .LT. ROW(1)) THEN
                Y(1) = ROW(1)
                Y(4) = ROW(2)
      ENDIF
C
C***************** READ FC OR EMISSIONS AT SPEED COL(I1-1) *************
C
      K3 = (I1-1)*7-7+2+J
      READ(4,326,END=350,REC=K3) (ROWG(I),I=1,NROW)
  350 I3 = 0
  355 I3 = I3+1
C
C***************** FIND FC OR EMISSIONS AT POINT 1 AND 4 **************
C
      IF (MP .GE. ROW(I3)) GO TO 355
           G(4) = ROWG(I3)
           G(1) = ROWG(I3-1)
      IF (MP .LT. ROW(1)) THEN
           G(1) = ROWG(1)
           G(4) = ROWG(2)
      ENDIF
C
C***************** READ MANIFOLD PRESSURE AT SPEED COL(I1) *************
C
      K4 = (I1)*7-7+2
      READ(4,326,END=360,REC=K4) (ROW(I),I=1,NROW)
  360 I4 = 0
  370 I4 = I4+1
C
C***************** FIND MANIFOLD PRESSURE AT POINT 2 AND 3 *************
C
      IF(MP .GE. ROW(I4)) GO TO 370
          Y(3) = ROW(I4)
          Y(2) = ROW(I4-1)
      IF(MP .LT. ROW(1)) THEN
                Y(2) = ROW(1)
                Y(3) = ROW(2)
      ENDIF
C
C***************** READ FC OR EMISSIONS AT SPEED COL(I1) **************
C
      K5 = (I1)*7-7+2+J
      READ(4,326,END=380,REC=K5) (ROWG(I),I=1,NROW)
  380 I5 = 0
  385 I5 = I5+1
C
C***************** FIND FC OR EMISSIONS AT POINT 2 AND 3 **************
C
      IF (MP .GE. ROW(I5)) GO TO 385
          G(3)=ROWG(I5)
          G(2)=ROWG(I5-1)
      IF (MP .LT. ROW(1)) THEN
```

```
                G(2) = ROWG(1)
                G(3) = ROWG(2)
      ENDIF
C
C**** COLLECT DATA TO 'COORD.OUT'*****************************************
C
      DO 356 IN = 1,4
      WRITE(7,*) X(IN),Y(IN),G(IN)
      WRITE(*,*) X(IN),Y(IN),G(IN)
  356 CONTINUE
C
      WRITE(7,390)
      WRITE(*,390)
  390 FORMAT('-------------------------------------------------')
  200 CONTINUE
  100 CONTINUE
C
      CLOSE(11)
      CLOSE(4)
      CLOSE(7)
      RETURN
      END
C
C*************************************************************************
C
      SUBROUTINE MLREGRESS(NTIME)
C
      DIMENSION A(10,10),B(10),C(10)
      DIMENSION X(4,2),G(4)
      K = 2
      N = 4
C
      OPEN(UNIT=7,FILE='COORD.OUT',STATUS='OLD')
      OPEN(UNIT=8,FILE='COEFFIC.OUT',STATUS='NEW')
C
      DO 100 LOOP = 1,NTIME
      READ(7,*) NLOOP
      WRITE(8,50) LOOP
      WRITE(*,50) LOOP
   50 FORMAT(2X,I4,4X,'C0',14X,'C1',12X,'C2')
C
      DO 200 J = 1,5
C
      DO 300 I = 1,N
      READ(7,*) (X(I,L),L =1,K),G(I)
  300 CONTINUE
C
      READ(7,350) TEXT
  350 FORMAT(20A4)
C
      DO 400 IR = 1,3
      B(IR) = 0.
      DO 400 IC = 1,3
      A(IR,IC) = 0.
  400 CONTINUE
```

```
C
C*****COMPUTE SQURE MATRIX ON LHS AND
C*****VECTOR ON RHS OF SYSTEM EQUATIONS:
C*****CALL SUBROUTINE FOR SOLVING SYSTEM EQS:
C
      DO 500 I = 1,N
C
      DO 600 IR = 1,K+1
      IF (IR .EQ. 1) FR = 1.
      IF (IR .GT. 1) FR = X(I,IR-1)
C
      DO 700 IC = 1,K+1
      IF (IC .EQ. 1) FC = 1.
      IF (IC .GT. 1) FC = X(I,IC-1)
      A(IR,IC) = A(IR,IC)+FR*FC
  700 CONTINUE
C
      B(IR) = B(IR)+FR*G(I)
  600 CONTINUE
  500 CONTINUE
C
      KP1 = K+1
C
      CALL GAUSS(KP1,A,B,C)
C
C**** COLLECT COEFFICIENTS TO 'COEFFIC.OUT' ************************
C
      WRITE(8,80) C(1),C(2),C(3)
      WRITE(*,80) C(1),C(2),C(3)
   80 FORMAT(3E15.4)
  200 CONTINUE
  100 CONTINUE
C
      CLOSE(7)
      CLOSE(8)
      RETURN
      END
C
C**********************************************************************
C
      SUBROUTINE GAUSS(N,A,B,X)
C
      DIMENSION A(10,10),B(10),X(10)
C
C*****PERFORM SCALING:
C
      CALL SCALE(N,A,B)
C
C*****FORWARD ELIMINATION: PERFORM ACCORDING TO
C*****THE ORDER OF 'PRIME' FROM 1 TO N-1:
C
      DO 100 IP = 1,N-1
C
C*****PERFORM PARTIAL PIVOTING:
C
```

```
      CALL PIVOT(N,A,B,IP)
C
C*****LOOP OVER EACH EQUATION STARTING FROM THE
C*****ONE THAT CORRESPONDS WITH THE ORDER OF
C*****'PRIME' PLUS ONE:
C
      DO 200 IE = IP+1,N
      RATIO = A(IE,IP)/A(IP,IP)
C
C*****COMPUTE NEW COEFF. OF THE EQ. CONSIDERED:
C
      DO 300 IC = IP+1,N
      A(IE,IC) = A(IE,IC)-RATIO*A(IP,IC)
  300 CONTINUE
C
      B(IE) = B(IE)-RATIO*B(IP)
  200 CONTINUE
C
C*****SET COEFF. ON LOWER LEFT PORTION TO ZERO:
C
      DO 400 IE = IP+1,N
      A(IE,IP) = 0.
  400 CONTINUE
  100 CONTINUE
C
C*****BACK SUBSTITUTION:
C*****COMPUTE SOLUTION OF THE LAST EQUATION:
C
      X(N) = B(N)/A(N,N)
C
C*****COMPUTE SOLUTIONS FROM EQUATION N-1 TO 1:
C
      DO 500 IE = N-1,1,-1
      SM = 0.
C
      DO 600 IC = IE+1,N
      SM = SM+A(IE,IC)*X(IC)
  600 CONTINUE
C
      X(IE) = (B(IE)-SM)/A(IE,IE)
  500 CONTINUE
C
      RETURN
      END
C
C**********************************************************************
C
      SUBROUTINE SCALE(N,A,B)
C
      DIMENSION A(10,10),B(10)
C
C*****PERFORM SCALING:
C
      DO 10 IE = 1,N
      BIG = ABS(A(IE,1))
```

```
C
      DO 20 IC = 2,N
      AMAX = ABS(A(IE,IC))
      IF (AMAX.GT.BIG) BIG = AMAX
   20 CONTINUE
C
      DO 30 IC = 1,N
      A(IE,IC) = A(IE,IC)/BIG
   30 CONTINUE
C
      B(IE) = B(IE)/BIG
   10 CONTINUE
C
      RETURN
      END
C
C*********************************************************************
C
      SUBROUTINE PIVOT(N,A,B,IP)
C
      DIMENSION A(10,10),B(10)
C
C*****PERFORM PARTIAL PIVOTING:
C
      JP = IP
      BIG = ABS(A(IP,IP))
C
      DO 10 I = IP+1,N
      AMAX = ABS(A(I,IP))
      IF (AMAX.GT.BIG) THEN
            BIG = AMAX
            JP = I
      ENDIF
   10 CONTINUE
C
            IF (JP .NE. IP) THEN
C
      DO 20 J = IP,N
      DUMY    = A(JP,J)
      A(JP,J) = A(IP,J)
      A(IP,J) = DUMY
   20 CONTINUE
C
      DUMY = B(JP)
      B(JP)= B(IP)
      B(IP)= DUMY
            ENDIF
      RETURN
      END
C
C*********************************************************************
C
      SUBROUTINE CAL_SUM(NTIME)
C
      DIMENSION SUM(5),GX(5),T(5)
```

```
      REAL*8 NE,MP
C
      OPEN(UNIT=11,FILE='ne_mp.dat',STATUS='OLD')
      OPEN(UNIT=8,FILE='COEFFIC.OUT',STATUS='OLD')
      OPEN(UNIT=4,FILE='MAP.DAT',STATUS='OLD',
     *ACCESS='DIRECT',FORM='FORMATTED',RECL=190)
      OPEN(UNIT=9,FILE='FC_EMM.OUT',STATUS='NEW')
C
      WRITE(9,20)
      WRITE(*,20)
   20 FORMAT(2X,'TIME',4X,'FC',10X,'NOX',10X,'CO',10X,'CO2',10X,'HC')
      WRITE(9,21)
   21 FORMAT(2X,'(SEC)',2X,'(G/S)',8X,'(G/S)',8X,'(G/S)',8X,'(G/S)'
     *       ,8X,'(G/S)')
      READ(11,50) TEXT
C
      DO 100 LOOP = 1,NTIME
      READ(11,*) I,NE,MP
      READ(8,50) TEXT
   40 FORMAT(7X,I4,F10.3,A7)
   50 FORMAT(20A4)
C
      DO 200 J = 1,5
      READ(8,*) C0,C1,C2
C
C**** CALCULATE FUEL CONSUMPTION AND EMISSION OF CAR AT TIME **********
C
  450 GX(J) = (C0+C1*NE+C2*MP)
C
  200 CONTINUE
C
C**** IF MANIFOLD PRESSURE LOWER THEN IDLE PRESSURE, ******************
C**** FUEL AND EMISSIONS = 0 ***************************************
C
        PRESSURE = 252.6
C
      IF ( MP .LT. PRESSURE ) THEN
        GX(1) = 0.
        GX(2) = 0.
        GX(3) = 0.
        GX(4) = 0.
        GX(5) = 0.
      ENDIF
C
      WRITE(9,70) LOOP,(GX(L),L=1,5)
      WRITE(*,70) LOOP,(GX(L),L=1,5)
   70 FORMAT(2X,I4,5E12.4)
C
C**** SUM FC AND EMISSIONS ALL TIME ************************************
C
      CALL TOTAL(LOOP,GX,SUM)
C
  100 CONTINUE
C
      DO 300 JJ = 1,5
```

```
      T(JJ) = 0.
      T(JJ) = SUM(JJ)
  300 CONTINUE
C
      CALL PRINTOUT(T,NTIME)
C
      CLOSE(11)
      CLOSE(8)
      CLOSE(4)
      CLOSE(9)
      RETURN
      END
C
C*********************************************************************
C
      SUBROUTINE TOTAL(LOOP,GX,SUM)
C
      DIMENSION GX(5),SUM(5)
C
      DO 100 J = 1,5
      IF (LOOP .EQ. 1) THEN
               SUM(J) = 0.
               SUM(J) = SUM(J)+GX(J)
      ELSE
               SUM(J) = SUM(J)+GX(J)
      ENDIF
  100 CONTINUE
C
      RETURN
      END
C
C*********************************************************************
C
      SUBROUTINE PRINTOUT(T,NTIME)
C
      DIMENSION T(5),TKM(5)
C
      WRITE(*,10)
   10 FORMAT(T3,'PLEASE INPUT DISTANCE(KM.) OF CAR DRIVE ON THIS TEST')
      READ(*,50) DIST
   50 FORMAT(F10.3)
C
      OPEN(UNIT=10,FILE='RESULT.OUT',STATUS='NEW')
C
      WRITE(10,920)
      WRITE(*,920)
  920 FORMAT(/)
C
      WRITE(10,925) NTIME
      WRITE(*,925) NTIME
  925 FORMAT(T3,'TOTAL TIME OF THIS TEST      :     ',I6,' SEC. ')
C
      WRITE(10,927) DIST
      WRITE(*,927) DIST
  927 FORMAT(T3,'DISTANCE OF CAR ON THIS TEST : ',F10.3,' KM. ')
```

```
C
      TKM(1) = T(1)/DIST
C
      WRITE(10,930) TKM(1)
      WRITE(*,930) TKM(1)
  930 FORMAT(T3,'FUEL CONSUMPTION OF CAR      : ',E15.6,' (G/KM.) ')
C
      TT = TKM(1)/747.8
      TTT = 1./TT
C
      WRITE(10,910) TT
      WRITE(*,910) TT
  910 FORMAT(T3,'FUEL CONSUMPTION OF CAR      : ',E15.6,' (L/KM.) ')
C
      WRITE(10,915) TTT
      WRITE(*,915) TTT
  915 FORMAT(T3,'FUEL CONSUMPTION OF CAR      : ',F15.3,' (KM/L) ')
C
      WRITE(10,940)
      WRITE(*,940)
  940 FORMAT(T3,'EMISSSIONS (G/KM)')
C
      TKM(2) = T(2)/DIST
C
      WRITE(10,950) TKM(2)
      WRITE(*,950) TKM(2)
  950 FORMAT(T6,'NOX :  ',E15.6)
C
      TKM(3) = T(3)/DIST
C
      WRITE(10,960) TKM(3)
      WRITE(*,960) TKM(3)
  960 FORMAT(T6,' CO :  ',E15.6)
C
      TKM(4) = T(4)/DIST
C
      WRITE(10,970) TKM(4)
      WRITE(*,970) TKM(4)
  970 FORMAT(T6,'CO2 :  ',E15.6)
C
      TKM(5) = T(5)/DIST
C
      WRITE(10,980) TKM(5)
      WRITE(*,980) TKM(5)
  980 FORMAT(T6,' HC :  ',E15.6)
C
      WRITE(10,990)
      WRITE(*,990)
  990 FORMAT(' THANK  YOU ')
C
      CLOSE(10)
      RETURN
      END
C
C*********************************************************************
```

ภาคผนวก ฉ

สมการที่ได้จากการประมาณค่าข้อมูลคิบ
เพื่อทำการปรับค่าช่วงแรงบิดของเครื่องยนต์ให้คงที่

ตารางที่ ฉ แสดงสมการประมาณค่าจากโปรแกรม EXCEL 7.0 เพื่อทำการปรับค่าช่วงแรงบิดของข้อมูลการทดสอบเครื่องยนต์ให้คงที่

SPEED (rpm)		Equation	R^2	Range (N.m)
@ 750	MAP	$y=2.7144484E-08X^6-7.7542711E-06X^5+8.5371441E-04X^4-4.5581217E-02X^3+1.2208196E+00X^2-9.1591364E+00X+2.7253562E+02$	1.0000008E+00	4.06-90.64
	FC	$y=6.2098099E-11X^6-1.7501299E-08X^5+1.9195596E-06X^4-1.0262062E-04X^3+2.7277184E-03X^2-2.7194894E-02X+2.2156459E-01$	9.9999995E-01	
	CO	$y=1.0402498E-05X^{1.4297686E+00}$	9.7161200E-01	
	CO_2	$y=-3.5415357E-10X^6+9.9345812E-08X^5-1.0647306E-05X^4+5.3536454E-04X^3-1.2260644E-02X^2+1.1234036E-01X+1.6907278E-01$	9.9999991E-01	
	HC	$y=2.192483E-11X^4-3.226860E-09X^3+7.665227E-08X^2+4.146480E-06X-1.010124E-07$	9.8678280E-01	

SPEED (rpm)		Equation	R^2	Range (N.m)
@ 1000	MAP	$y=-6.6152172E-09X^6+1.8566510E-06X^5+1.9400059E-04X^4+9.1213954E-03X^3-1.7589600E-01X^2+6.1411446E+00X+2.1488962E+02$	9.9994251E-01	7.17-98.12
	FC	$y=-1.4447310E-11X^6+4.7248772E-09X^5-5.8107254E-07X^4+3.4023546E-05X^3-9.6710756E-04X^2+1.7868120E-02X+1.1787123E-01$	9.9998753E-01	
	CO	$y=3.4437373E-11X^6-9.0506691E-09X^5+9.1414484E-07X^4-4.4493031E-05X^3+1.0705947E-03X^2-1.1491074E-02X+4.3189791E-02$	9.9979132E-01	
	CO_2	$y=-2.0481049E-10X^6+5.6842462E-08X^5-6.244731E-06X^4+3.4973651E-04X^3-1.0522558E-02X^2+1.7204365E-01X-1.6765881E-01$	9.9952152E-01	
	HC	$y=2.0619366E-14X^6-2.5915855E-12X^5-6.2860213E-11X^4+2.1827917E-08X^3-1.2001971E-06X^2+2.7555152E-05X-3.4567381E-05$	9.9987885E-01	

SPEED (rpm)		Equation	R^2	Range (N.m)
@ 1200	MAP	$y=-1.8541938E-10X^6-3.4522056E-07X^5+9.5293866E-05X^4-8.9279202E-03X^3+3.6901868E-01X^2-1.4820562E+00X+2.5649563E+02$	9.9998207E-01	4.12-102.73
	FC	$y=1.6260636E-11X^6-4.8723480E-09X^5+5.5917486E-07X^4-3.0175911E-05X^3+7.5973188E-04X^2-6.3307875E-04X+2.2015898E-01$	9.9999639E-01	
	CO	$y=1.9256820E-11X^6-5.0849667E-09X^5+5.1315665E-07X^4-2.4643118E-05X^3+5.7152470E-04X^2-5.4825847E-03X+1.9148491E-02$	9.9976802E-01	
	CO_2	$y=-6.8015720E-11X^6+1.5232973E-08X^5-1.2476216E-06X^4+4.6842299E-05X^3-6.2431963E-04X^2+1.0291258E-02X+9.2591918E-01$	9.9998865E-01	
	HC	$y=-4.5835436E-15X^6+3.6402171E-12X^5-6.4209089E-10X^4+4.5450888E-08X^3-1.4412757E-06X^2+1.905387E-05X+9.5383253E-05$	9.9976933E-01	

SPEED (rpm)		Equation	R^2	Range (N.m)
@ 1500	MAP	$y=8.6435720E-09X^6-3.3270044E-06X^5+4.7586738E-04X^4-3.1569152E-02X^3+1.0065585E+00X^2-9.8676354E+00X+2.8703988E+02$	9.9973599E-01	5.07-106.89
	FC	$y=1.5220864E-11X^6-5.1679600E-09X^5+6.6647547E-07X^4-3.9731887E-05X^3+1.0999602E-03X^2-4.8175521E-03X+2.9443098E-01$	9.9991086E-01	
	CO	$y=1.8939578E-11X^6-5.1637182E-09X^5+5.4179432E-07X^4-2.7438520E-05X^3+6.8942299E-04X^2-7.5328544E-03X+3.1480265E-02$	9.9990546E-01	
	CO_2	$y=-1.7280517E-10X^6+4.7543154E-08X^5-4.9185939E-06X^4+2.3340291E-04X^3-4.3968613E-03X^2+2.0834377E-02X+1.3612307E+00$	9.9972880E-01	
	HC	$y=5.9829231E-15X^6-2.6254525E-13X^5-1.1001641E-10X^4+1.0441739E-08X^3-2.3997836E-07X^2-3.8960248E-07X+1.6631340E-04$	9.9980980E-01	

ตารางที่ ฉ (ต่อ) แสดงสมการประมาณค่าจากโปรแกรม EXCEL 7.0 เพื่อทำการปรับค่าช่วงแรงบิดของข้อมูลการทดสอบเครื่องยนต์ให้คงที่

SPEED (rpm)		Equation	R^2	Range (N.m)
@ 1800	MAP	$y=-1.5303233E-09X^6+3.9778304E-07X^5-2.6194320E-05X^4-8.7782276E-04X^3+1.4644118E-01X^2+2.2569421E-01X+2.5561685E+02$	9.9997557E-01	4.10-116.17
	FC	$y=8.2627173E-12X^6-2.8127449E-09X^5+3.8121385E-07X^4-2.5575837E-05X^3+8.4924105E-04X^2-1.8965493E-03X+3.6818009E-01$	9.9999343E-01	
	CO	$y=1.58002721E-11X^6-4.8216294E-09X^5+5.63205852E-07X^4-3.15120351E-05X^3+8.54646278E-04X^2-9.34863300E-03X+3.52956082E-02$	9.9979697E-01	
	CO_2	$y=3.68170282E-10X^6-1.27071597E-07X^5+1.66433917E-05X^4-1.03836726E-03X^3+3.13200356E-02X^2-3.62189907E-01X+2.30763072E+00$	9.9994995E-01	
	HC	$y=2.97207848E-14X^6-8.89892833E-12X^5+1.02128012E-09X^4-5.70152485E-08X^3+1.60362826E-06X^2-1.87222943E-05X+1.36384403E-04$	9.9842221E-01	

SPEED (rpm)		Equation	R^2	Range (N.m)
@ 2100	MAP	$y=-2.38115521E-09X^6+7.51415503E-07X^5-8.82826480E-05X^4+4.77435394E-03X^3-1.19295721E-01X^2+6.00564235E+00X+2.29107324E+$	9.9986402E-01	5.18-111.17
	FC	$y=5.34101657E-12X^6-1.15344245E-09X^5+7.81444540E-08X^4-1.17108472E-06X^3-4.57129510E-05X^2+1.26082821E-02X+3.69761700E-01$	9.9999215E-01	
	CO	$y=2.64083047E-11X^6-7.29194763E-09X^5+7.57385710E-07X^4-3.6756470E-05X^3+8.44139196E-04X^2-7.79742602E-03X+3.52270211E-02$	9.9997740E-01	
	CO_2	$y=4.59089275E-10X^6-4.97065206E-08X^5+5.50351101E-06X^4-2.62883734E-04X^3+5.39705806E-03X^2-7.24682743E-03X+1.25283073E+00$	9.7334752E-01	
	HC	$y=3.67914777E-14X^6-9.61494846E-12X^5+9.32499438E-10X^4-4.24179261E-08X^3+9.76684276E-07X^2-9.40381111E-06X+8.51020864E-05$	9.9991486E-01	

SPEED (rpm)		Equation	R^2	Range (N.m)
@ 2500	MAP	$y=8.30543981E-10X^6-4.13095923E-07X^5+7.56715901E-05X^4-6.52364032E-03X^3+2.76415014E-01X^2-8.27745538E-01X+2.52927933E+02$	9.9999620E-01	6.23-130.70
	FC	$y=3.5682737E-12X^6-1.4926350E-09X^5+2.4740886E-07X^4-1.9993496E-05X^3+7.9367570E-04X^2+2.4087039E-04X+5.1420975E-01$	9.9999795E-01	
	CO	$y=1.6811893E-12X^6-3.7098087E-10X^5+2.3704999E-08X^4-1.6870212E-08X^3-4.1555702E-05X^2+1.3265356E-03X+1.3566066E-02$	9.9998512E-01	
	CO_2	$y=-1.5372976E-12X^6-2.3069268E-09X^5+6.8955298E-07X^4-6.8957917E-05X^3+2.8785505E-03X^2+1.1716840E-02X+1.5061718E+00$	9.9999696E-01	
	HC	$y=5.1068446E-15X^6-1.6671659E-12X^5+2.1560664E-10X^4-1.4194044E-08X^3+4.8049672E-07X^2-5.059250E-06X+8.1827239E-05$	9.9981008E-01	

SPEED (rpm)		Equation	R^2	Range (N.m)
@ 3000	MAP	$y=2.7727809E-09X^6-1.0240602E-06X^5+1.4867964E-04X^4-1.0674761E-02X^3+3.8855884E-01X^2-2.1406824E+00X+2.5650736E+02$	9.9999987E-01	8.27-105.39
	FC	$y=5.8166281E-12X^6-2.6162778E-09X^5+4.3567734E-07X^4-3.3842827E-05X^3+1.2554833E-03X^2-3.4455076E-03X+6.1267941E-01$	1.0000002E+00	
	CO	$y=3.1148560E-12X^6-1.0628499E-09X^5+1.4021163E-07X^4-8.9438717E-06X^3+2.8222019E-04X^2-3.6251437E-03X+3.459977E-02$	9.9999995E-01	
	CO_2	$y=9.7612110E-11X^6-3.4417494E-08X^5+4.7058503E-06X^4-3.1323791E-04X^3+1.0284171E-02X^2-7.7798305E-02X+2.1081567E+00$	1.0000000E+00	
	HC	$y=5.5785813E-14X^6-1.8414784E-11X^5+2.3670467E-09X^4-1.4870435E-07X^3+4.6341851E-06X^2-6.1748684E-05X+3.3000046E-04$	1.0000001E+00	

ตารางที่ ฉ (ต่อ) แสดงสมการประมาณค่าจากโปรแกรม EXCEL 7.0 เพื่อทำการปรับค่าช่วงแรงบิดของข้อมูลการทดสอบเครื่องยนต์ให้คงที่

SPEED (rpm)		Equation	R^2	Range (N.m)
@3500	MAP	$y=2.6894220E-09X^6-9.3610110E-07X^5+1.2730991E-04X^4-8.4091956E-03X^3+2.6709131E-01X^2+1.0531789E+00X+2.3495895E+02$	9.9999999E-01	8.33-102.98
	FC	$y=1.9225412E-11X^6-6.2693051E-09X^5+7.9133859E-07X^4-4.8397869E-05X^3+1.4515034E-03X^2+6.8436209E-04X+6.8732817E-01$	9.9999989E-01	
	CO	$y=-2.2061164E-12X^6+6.835894E-10X^5-8.4172143E-08X^4+5.3466606E-06X^3-1.9106980E-04X^2+3.934498E-03X+2.4533402E-03$	9.9999976E-01	
	CO_2	$y=3.2953596E-11X^6-1.8967590E-08X^5+3.32219998E-06X^4-2.5654223E-04X^3+9.1275317E-03X^2-5.4195781E-02X+2.5011205E+00$	9.9999986E-01	
	HC	$y=-4.8118213E-14X^6+1.5455261E-11X^5-1.8822216E-09X^4+1.0771761E-07X^3-2.9662099E-06X^2+3.9547093E-05X-1.0833981E-04$	9.9999998E-01	

SPEED (rpm)		Equation	R^2	Range (N.m)
@4000	MAP	$y=-8.2115015E-09X^6+2.4913956E-06X^5-2.8145627E-04X^4+1.4521309E-02X^3-3.3715404E-01X^2+7.5257114E+00X+2.1757782E+02$	9.9999985E-01	10.16-104.56
	FC	$y=-2.6092357E-11X^6+8.6589331E-09X^5-1.0721833E-06X^4+6.1844996E-05X^3-1.6993155E-03X^2+4.2665500E-02X+6.730353E-01$	1.0000000E+00	
	CO	$y=3.2678074E-11X^6-8.4843570E-09X^5+8.2924459E-07X^4-3.7762747E-05X^3+8.0848621E-04X^2-7.3597468E-03X+5.9192226E-02$	1.0000000E+00	
	CO_2	$y=-2.8707905E-10X^6+8.9842451E-08X^5-1.0796094E-05X^4+6.2471571E-04X^3-1.8059724E-02X^2+3.3616400E-01X+1.4106111E+00$	9.9999983E-01	
	HC	$y=9.6667330E-14X^6-2.7936578E-11X^5+3.0280954E-09X^4-1.5369993E-07X^3+3.8180726E-06X^2-4.5287077E-05X+2.4912651E-04$	1.0000000E+00	

ภาคผนวก ช

สมการที่ได้จากการประมาณค่าข้อมูลดิบเพื่อทำการปรับค่า
ช่วงความดันสัมบูรณ์ท่อร่วมไอดีของเครื่องยนต์ให้คงที่

ตารางที่ ช แสดงสมการประมาณค่าจากโปรแกรม EXCEL 7.0 เพื่อทำการปรับค่าช่วงความดันสัมบูรณ์ท่อร่วมไอดีของข้อมูลการทดสอบเครื่องยนต์ให้คงที่

SPEED (rpm)		Equation	R^2	Range (mmHg)
@ 750	FC	$y=6.2668840E-16X^6-1.8532251E-12X^5+2.2395479E-09X^4-1.4117899E-06X^3+4.8826894E-04X^2-8.678686E-02X+6.2971176E+00$	9.9993866E-01	252.65-767
	CO	$y=-2.5192496E-12X^4+4.7998180E-09X^3-3.2851272E-06X^2+9.6262627E-04X-1.0058033E-01$	9.9999219E-01	
	CO_2	$y=-5.9832744E-15X^6+1.7443194E-11X^5-2.0525564E-08X^4+1.2407860E-05X^3-4.0374532E-03X^2+6.6835278E-01X-4.3556491E+01$	1.0000008E+00	
	HC	$y=-5.2078636E-16X^5+1.2476346E-12X^4-1.1625842E-09X^3+5.2298616E-07X^2-1.1252461E-04X+9.2658095E-03$	1.0000007E+00	

SPEED (rpm)		Equation	R^2	Range (mmHg)
@ 1000	FC	$y=1.4189217E-13X^5-3.2608676E-10X^4+2.9412976E-07X^3-1.2954463E-04X^2+2.8902152E-02X-2.3802196E+00$	9.9993444E-01	252.65-743.17
	CO	$y=-7.5950956E-18X^6+2.5950361E-14X^5-3.6597751E-11X^4+2.6957106E-08X^3-1.0781544E-05X^2+2.0007639E-03X-1.8221545E-01$	9.9995484E-01	
	CO_2	$y=8.0457634E-13X^5-2.0186324E-09X^4+2.0079831E-06X^3-9.8123310E-04X^2+2.3640459E-01X-2.1440053E+01$	9.9998025E-01	
	HC	$y=2.2182311E-14X^4-3.2529008E-11X^3+1.2709585E-08X^2-2.7160205E-07X-1.9278207E-04$	9.6957063E-01	

SPEED (rpm)		Equation	R^2	Range (mmHg)
@ 1200	FC	$y=4.6335358E-16X^6-1.1613196E-12X^5+1.1354861E-09X^4-5.3759244E-07X^3+1.2106518E-04X^2-8.1450569E-03X-3.3173741E-01$	9.9999021E-01	256-765
	CO	$y=-3.1693953E-16X^6+8.3971860E-13X^5-9.0863306E-10X^4+5.1038280E-07X^3-1.5785464E-04X^2+2.5448793E-02X-1.6884853E+00$	1.0000035E+00	
	CO_2	$y=-3.5118423E-16X^6+9.3930810E-12X^5-1.0323756E-08X^4+5.9693283E-06X^3-1.9071554E-03X^2+3.2036583E-01X-2.1214636E+01$	9.9993185E-01	
	HC	$y=-4.4254023E-18X^6-1.2575245E-14X^5-1.4564849E-11X^4+8.7880070E-09X^3-2.9104650E-06X^2+5.0136040E-04X-3.4919637E-02$	9.9996151E-01	

SPEED (rpm)		Equation	R^2	Range (mmHg)
@ 1500	FC	$y=-2.9392898E-16X^6+1.1368506E-12X^5-1.6903359E-09X^4+1.2826846E-06X^3-5.0527462E-04X^2+1.0505307E-01X-8.5886898E+00$	9.9998686E-01	259-767
	CO	$y=-3.3940868E-16X^6+9.2431634E-13X^5-1.0214746E-09X^4+5.8470158E-07X^3-1.8228408E-04X^2+2.9334070E-02X-1.8988991E+00$	9.9997271E-01	
	CO_2	$y=-9.7236908E-15X^6+2.6713658E-11X^5-2.9599694E-08X^4+1.6819669E-05X^3-5.1183987E-03X^2+7.8523407E-01X-4.5876057E+01$	9.9998649E-01	
	HC	$y=1.9090053E-18X^6-5.2623234E-15X^5-5.9877279E-12X^4-3.6053961E-09X^3+1.2120987E-06X^2-2.1531226E-04X+1.5871059E-02$	9.9912407E-01	

SPEED (rpm)		Equation	R^2	Range (mmHg)
@ 1800	FC	$y=9.0148685E-16X^6-2.4738624E-12X^5+2.7342329E-09X^4-1.5463712E-06X^3+4.6724639E-04X^2-6.8343701E-02X+3.9050507E+00$	9.9999743E-01	259-766
	CO	$y=-5.7472763E-14X^5+1.3422741-10X^4-1.2285660E-07X^3+5.4734989E-05X^2-1.171735E-02X+9.6983597E-01$	9.9995093E-01	
	CO_2	$y=1.9522927E-12X^5-4.7966427E-09X^4+4.4972995E-06X^3-2.0206402E-03X^2+4.4475271E-01X-3.7283396E+01$	9.5619758E-01	
	HC	$y=2.7961907E-18X^6-7.6900070E-15X^5+8.6480451E-12X^4-5.0948724E-09X^3+1.6593241E-06X^2-2.8289230E-04X+1.9765605E-02$	9.9870087E-01	

ตารางที่ ช (ต่อ) แสดงสมการประมาณค่าจากโปรแกรม EXCEL 7.0 เพื่อทำการปรับค่าช่วงความดันสัมบูรณ์ที่อร่วมไอดีของข้อมูลการทดสอบเครื่องยนต์ให้คงที่

SPEED (rpm)		Equation	R^2	Range (mmHg)
@ 2100	FC	$y=9.7314620E-16X^6-2.6200697E-12X^5+2.8606374E-09X^4-1.6183621E-06X^3-5.0005457E-04X^2-7.7656579E-02X+5.0107117E+00$	9.9994619E-01	258-765
	CO	$y=2.6767662E-15X^5-6.9805738E-11X^4+6.9493142E-08X^3-3.2934176E-05X^2+7.5228900E-03X-6.5119412E-01$	9.9063485E-01	
	CO_2	$y=1.5048053E-12X^5-4.3055104E-09X^4+4.5887684E-06X^3-2.2892192E-03X^2+5.4493119E-01X-4.8370678E+01$	9.7488558E-01	
	HC	$y=3.0738777E-18X^6-8.1472314E-15X^5+8.7811815E-12X^4-4.9315421E-09X^3+1.5251971E-06X^2-2.4650380E-04X+1.6323663E-02$	9.9987165E-01	

SPEED (rpm)			R^2	Range (mmHg)
@ 2500	FC	$y=6.4810869E-16X^6-1.6868203E-12X^5+1.7784600E-09X^4-9.677680E-07X^3+2.8447694E-04X^2-3.9193750E-02X+2.1989597E+00$	9.9999466E-01	257-768
	CO	$y=1.0277414E-15X^6-2.7116746E-12X^5+2.9082239E-09X^4-1.6209417E-06X^3+4.9480224E-04X^2-7.8346593E-02X+5.0462833E+00$	9.9989002E-01	
	CO_2	$y=-2.6002258E-12X^5+5.8168359E-09X^4-5.0440586E-06X^3+2.1097097E-03X^2-4.1108279E-01X+3.1160578E+01$	9.9930062E-01	
	HC	$y=1.4545830E-18X^6-3.9731496E-15X^5+4.4351957E-12X^4-2.5901687E-09X^3+8.3386584E-07X^2-1.3960216E-04X+9.5217075E-03$	9.9993626E-01	

SPEED (rpm)		Equation	R^2	Range (mmHg)
@ 3000	FC	$y=-1.7006891E-13X^5+3.6134565E-10X^4-2.9209283E-07X^3+1.1149317E-04X^2-1.6092302E-02X+9.8489320E-01$	9.9999552E-01	260-678.10
	CO	$y=4.3678196E-16X^6-1.2214259E-12X^5+1.3541587E-09X^4-8.2995204E-07X^3+2.7139957E-04X^2-4.6091612E-02X+3.13892456E+00$	9.9998527E-01	
	CO_2	$y=-2.0039917E-13X^5+3.7554006E-10X^4-2.5205026E-07X^3+6.3640817E-05X^2+1.5019284E-02X-3.2464578E+00$	9.9997917E-01	
	HC	$y=8.0444707E-18X^6-2.2148446E-14X^5+2.4961360E-11X^4-1.4718450E-08X^3+4.7801146E-06X^2-8.0871961E-04X+5.5648289E-02$	9.9998170E-01	

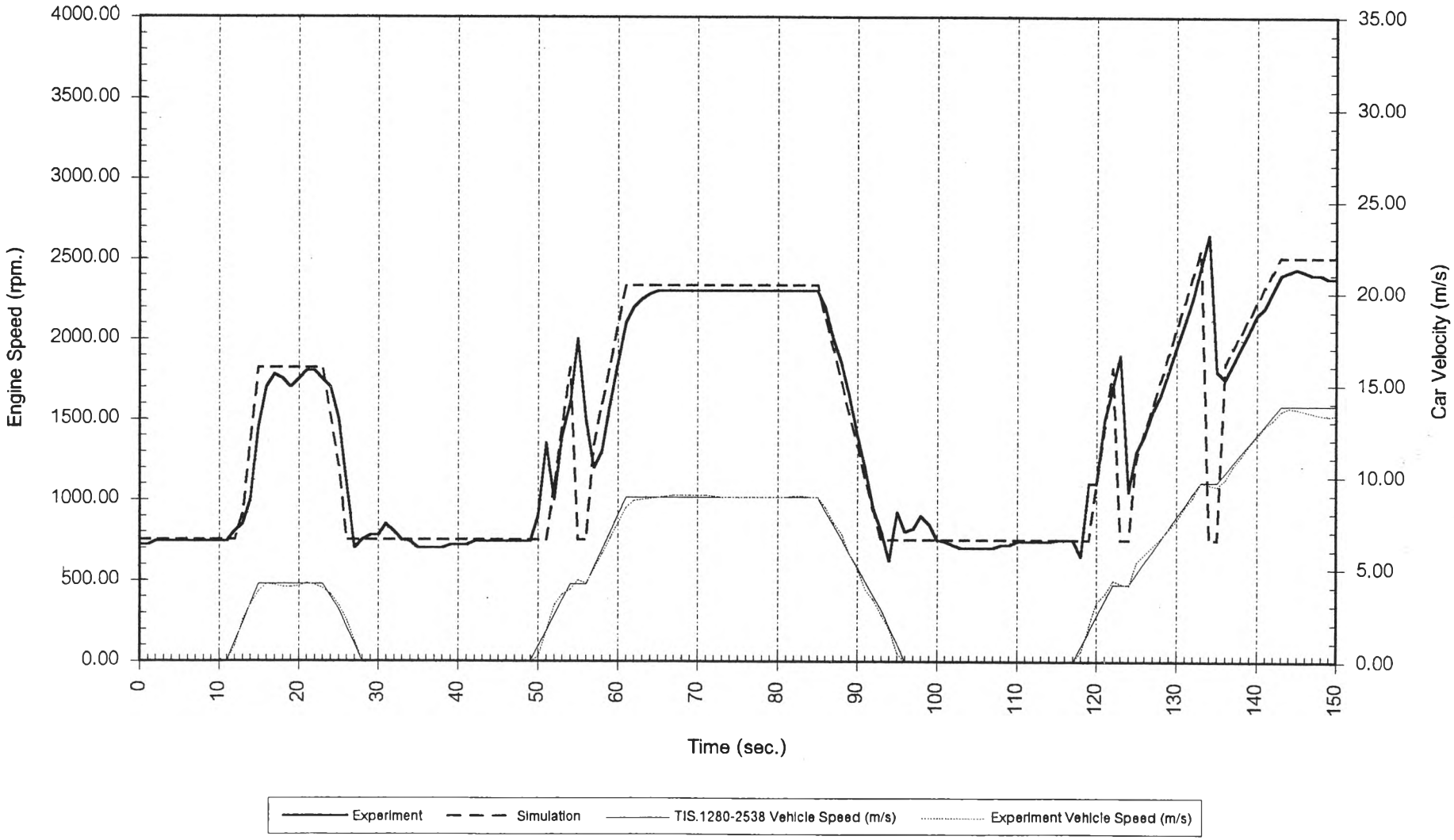
SPEED (rpm)		Equation	R^2	Range (mmHg)
@ 3500	FC	$y=-1.4410873-09X^3+2.5130088E-06X^2+3.0621028E-03X-1.6212704E-01$	9.9998168E-01	258-676.10
	CO	$y=-3.3226235E-16X^6+8.9787588E-13X^5-9.9766580E-10X^4+5.8434042E-07X^3-1.9073019E-04X^2+3.303716E-02X-3445844E+00$	1.0001983E+00	
	CO_2	$y=-4.1317072E-12X^5+8.8137350E-09X^4-7.4011010E-06X^3+3.0464131E-03X^2-5.9531123E-01X+4.6135078E+01$	9.9999205E-01	
	HC	$y=-7.0718389E-18X^6+1.9553164E-14X^5-2.1997971E-11X^4+1.2864150E-08X^3-4.1198938E-06X^2+6.8566120E-04X-4.6315899E-02$	1.0000117E+00	

SPEED (rpm)		Equation	R^2	Range (mmHg)
@ 4000	FC	$y=7.4869792E-13X^5-1.6839798E-09X^4+1.4893728E-06X^3-6.4626185E-04X^2+1.4222260E-01X-1.1754050E+01$	9.9998303E-01	271.70-679.10
	CO	$y=6.1317703E-15X^6-1.5467584E-11X^5+1.5948039E-08X^4-8.5953098E-06X^3+2.5525703E-03X^2-3.9600195E-01X+2.5120135E+01$	1.0000043E+00	
	CO_2	$y=-2.4775962E-13X^5+1.1936660E-10X^4+2.8335206E-07X^3-2.9442249E-04X^2+1.1943863E-01X-1.3159394E+01$	9.9991466E-01	
	HC	$y=2.6843102E-09X^2-1.8949591E-06X+3.6185463E-04$	7.2841659E-01	

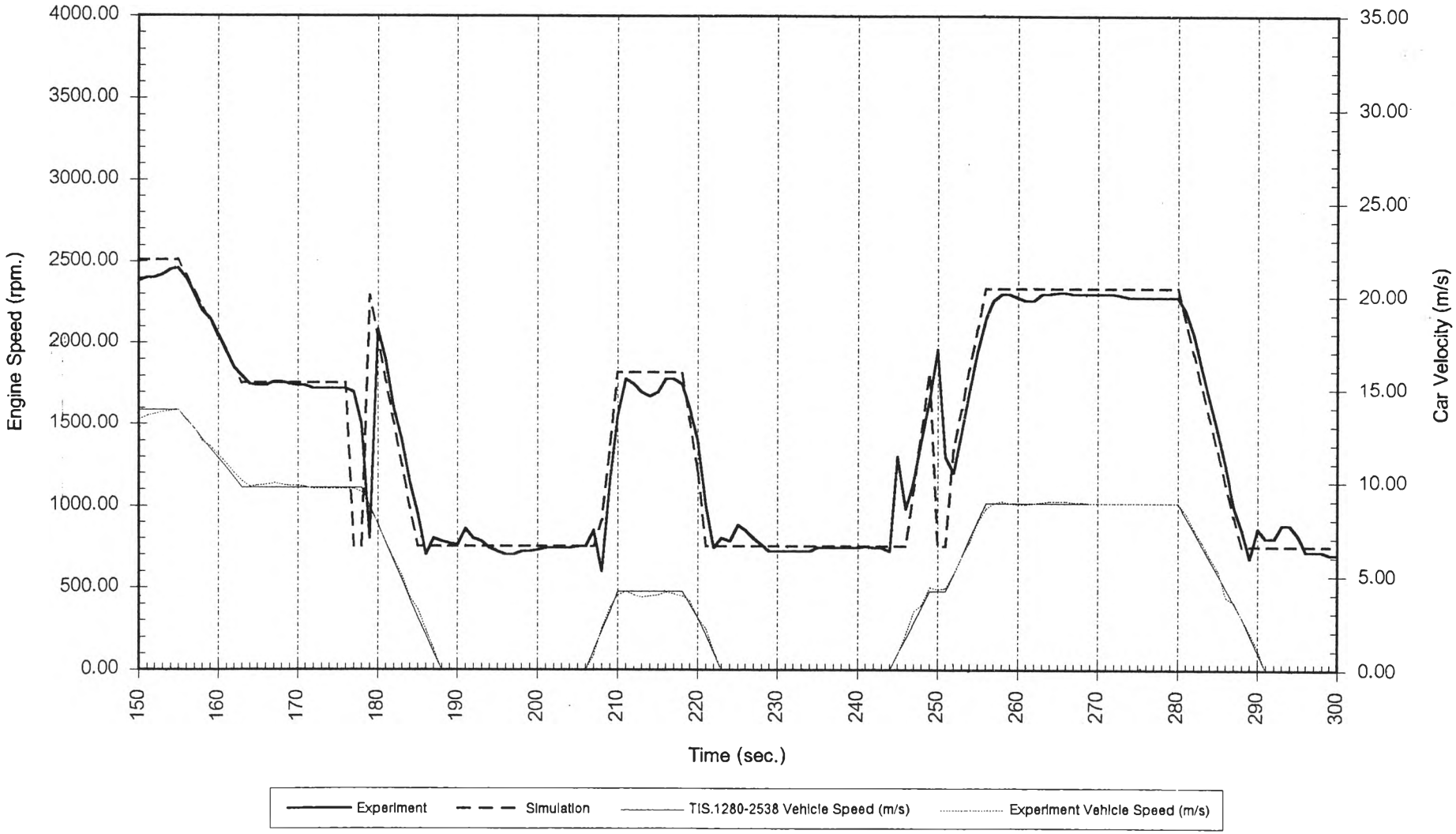
ภาคผนวก ช

การเปรียบเทียบข้อมูลที่ได้จากการคำนวณ และการประมาณค่าจาก V.F.C.E. Model กับค่าที่ได้จากการทดสอบรถยนต์ และการประมาณค่า จากแบบจำลองที่ถูกดัดแปลง

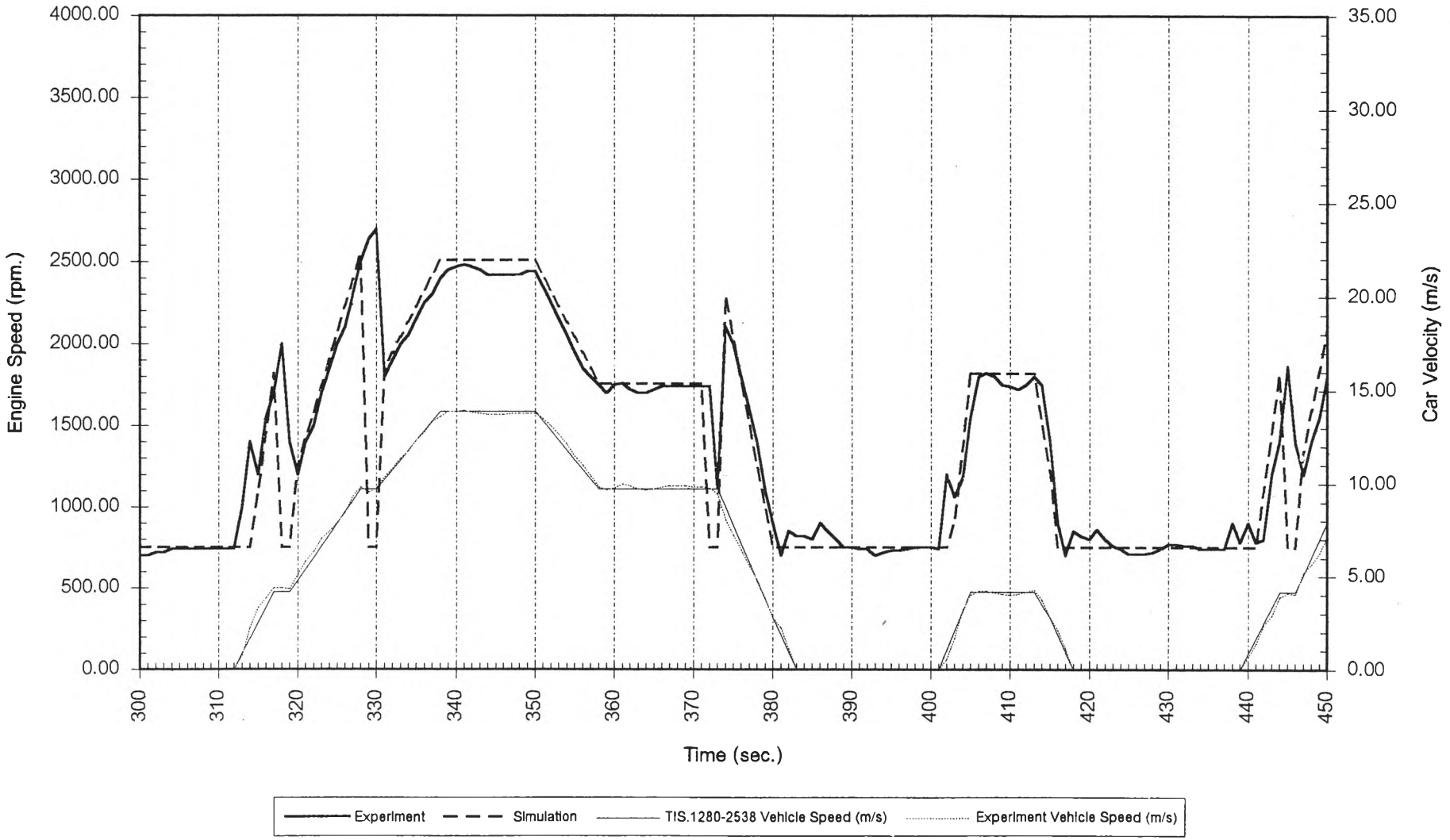
รูปที่ ซ1 Compare Engine Speed from Experiment and Simulation (0-150 s.)



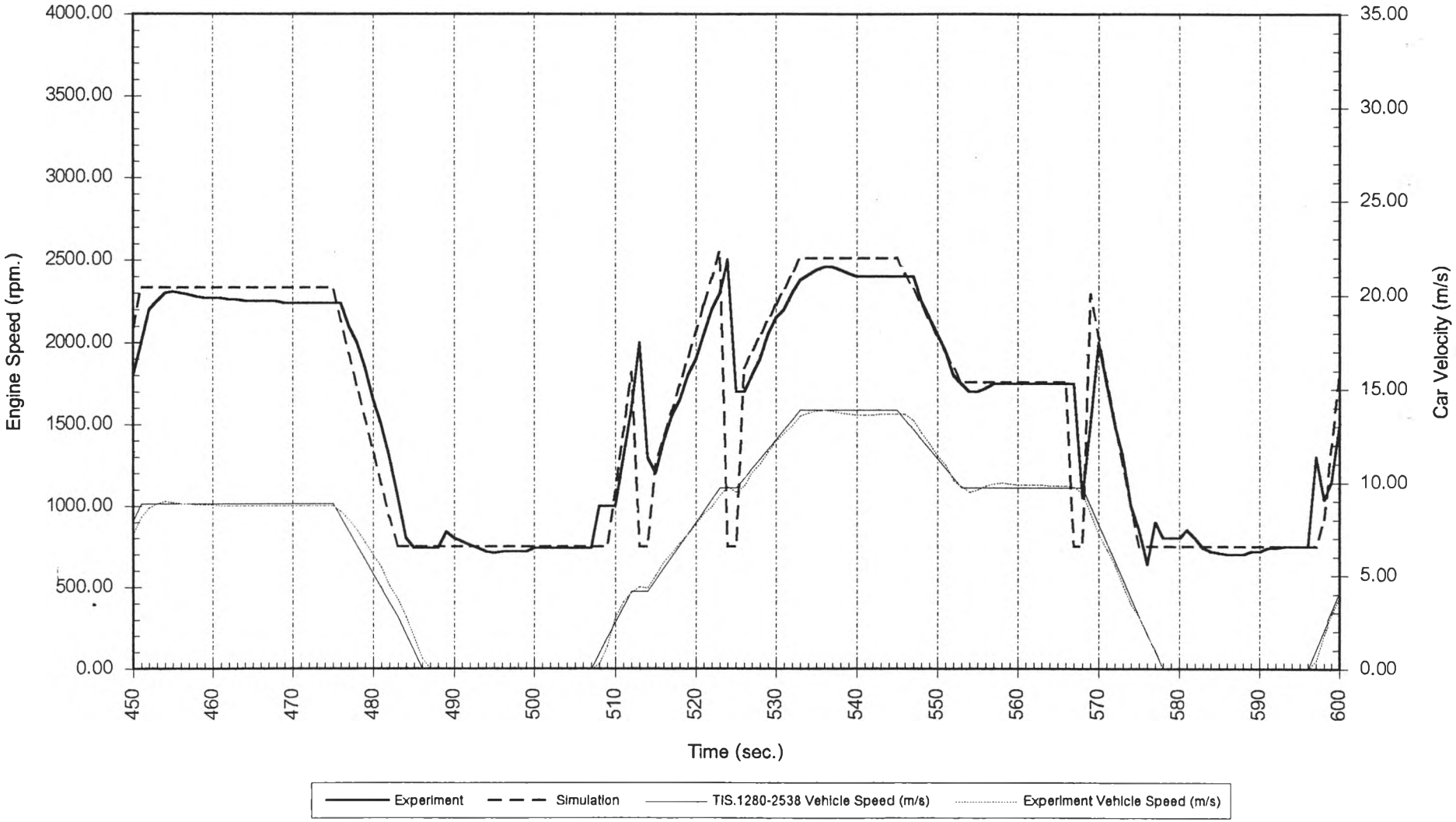
รูปที่ ซ1 (ต่อ) Compare Engine Speed from Experiment and Simulation (150-300 s.)



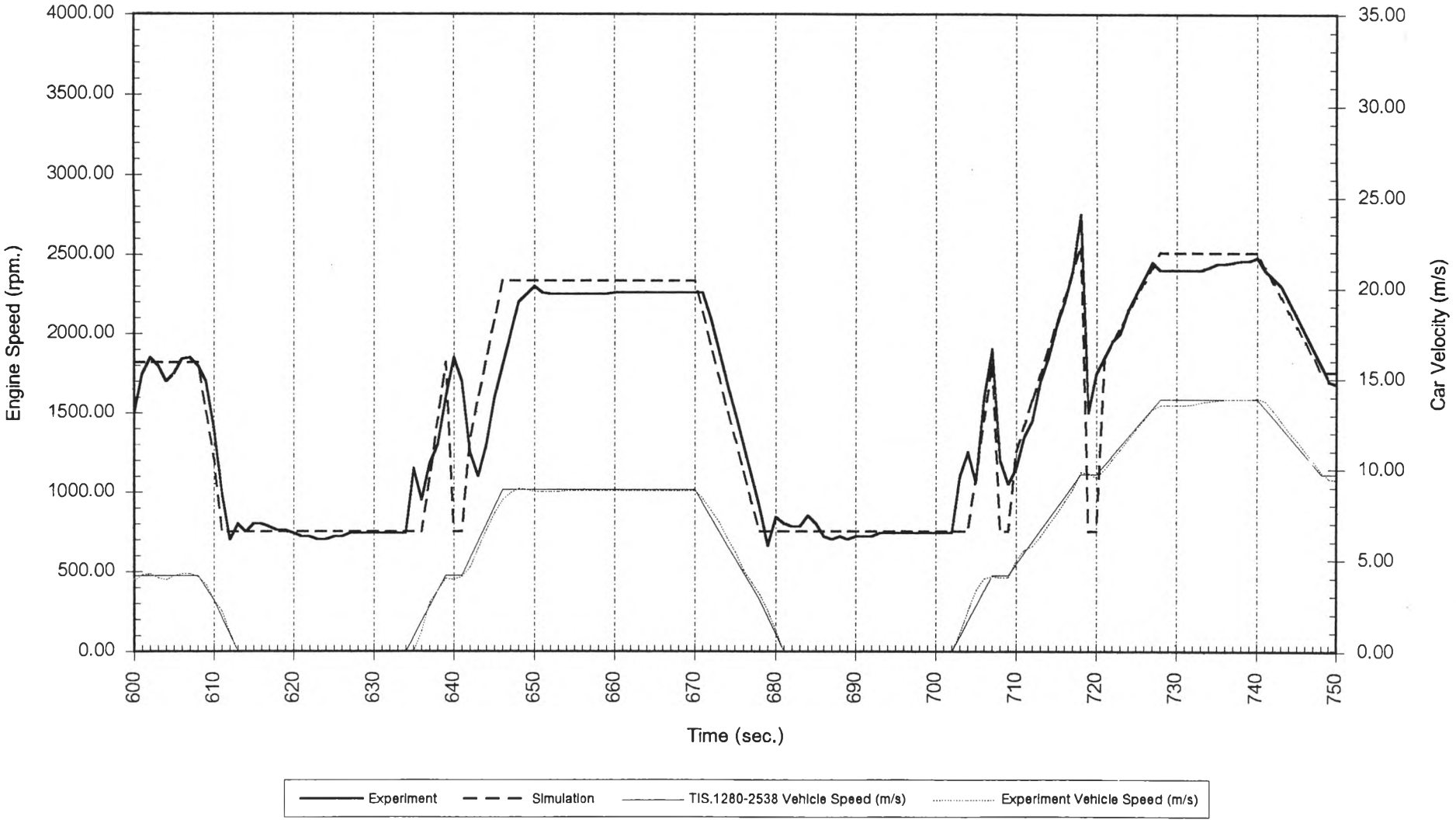
รูปที่ ซ1 (ต่อ) Compare Engine Speed from Experiment and Simulation (300-450 s.)



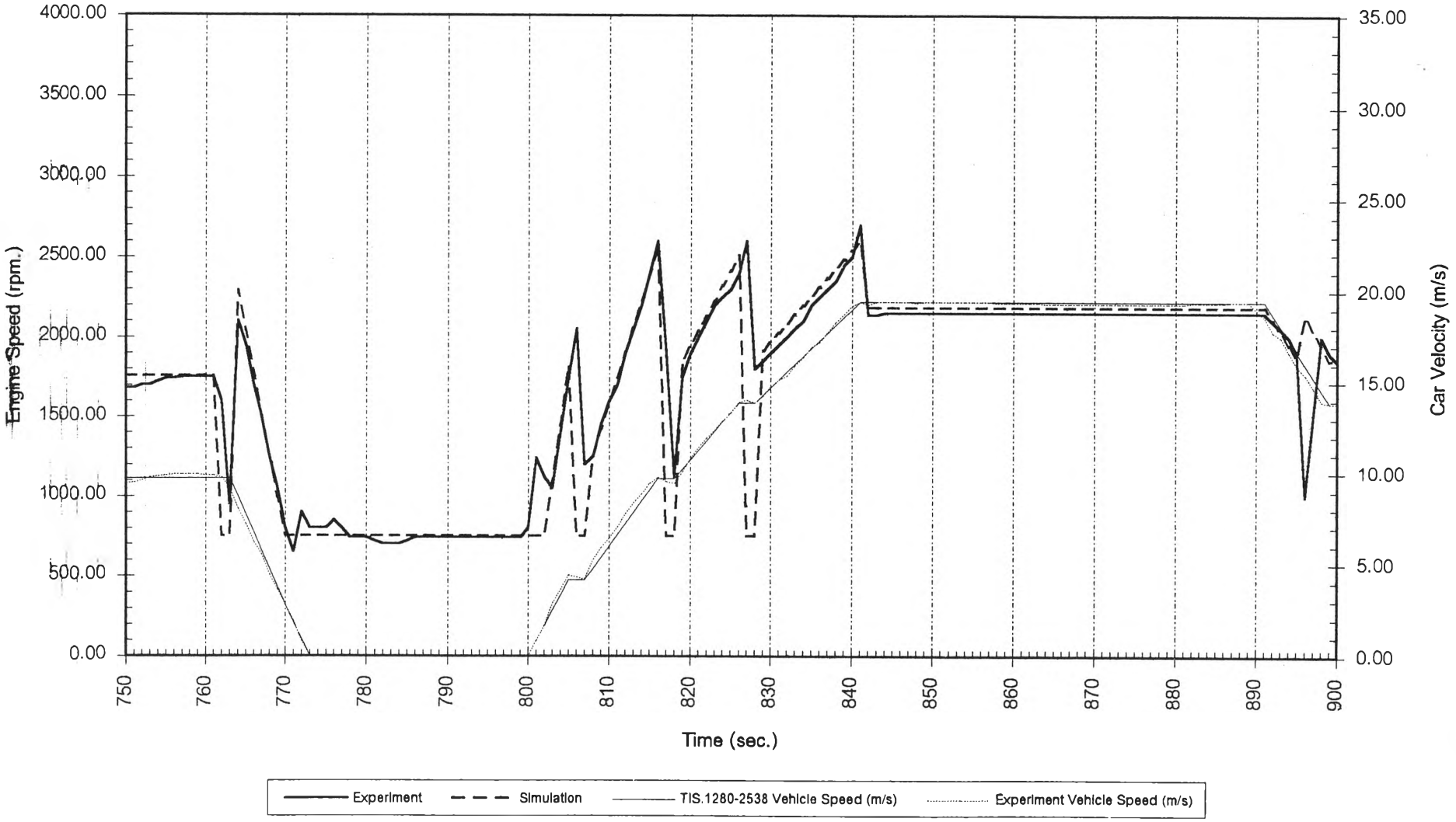
รูปที่ ซ1 (ต่อ) Compare Engine Speed from Experiment and Simulation (450-600 s.)



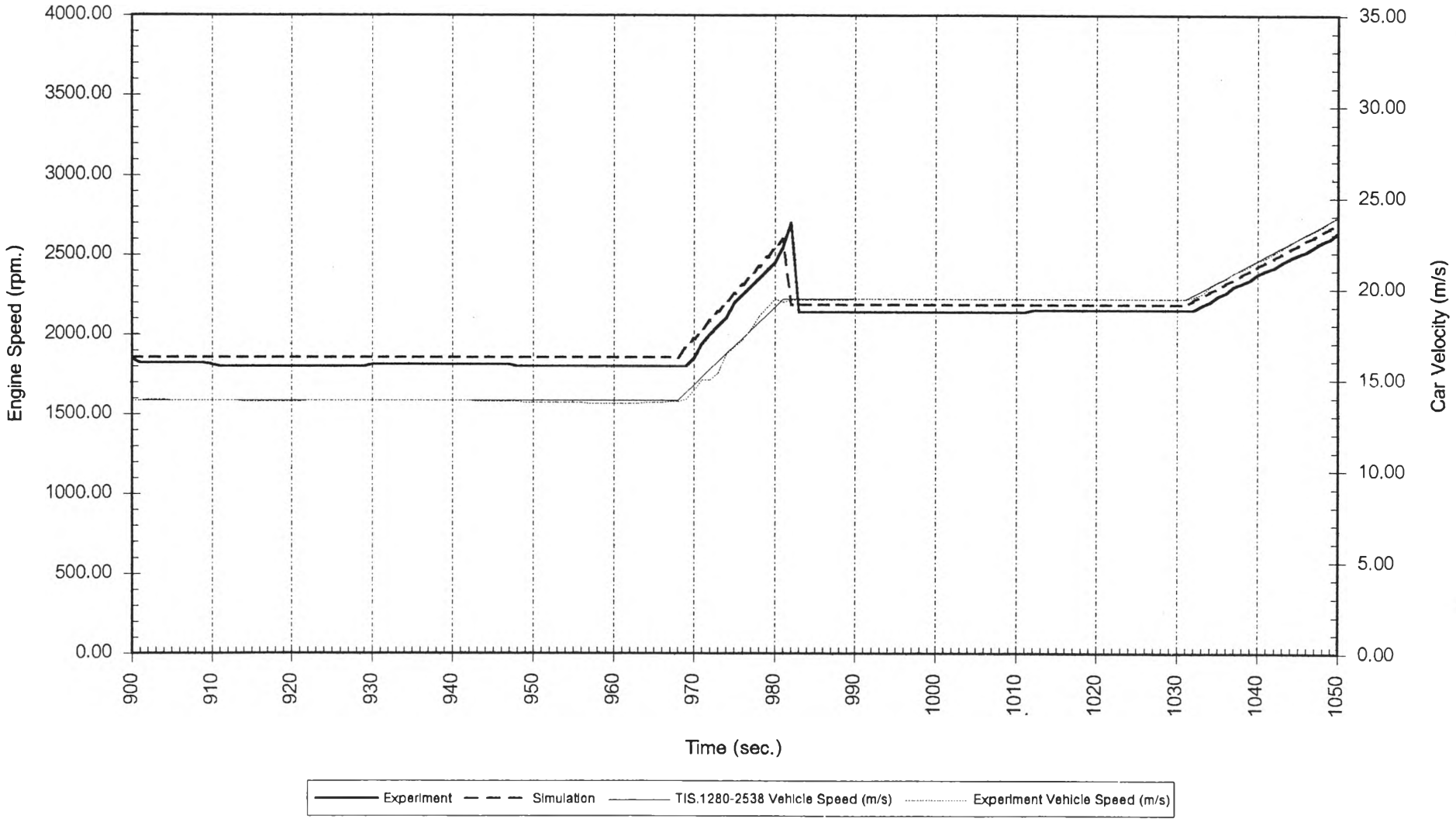
รูปที่ ซ1 (ต่อ) Compare Engine Speed from Experiment and Simulation (600-750 s.)



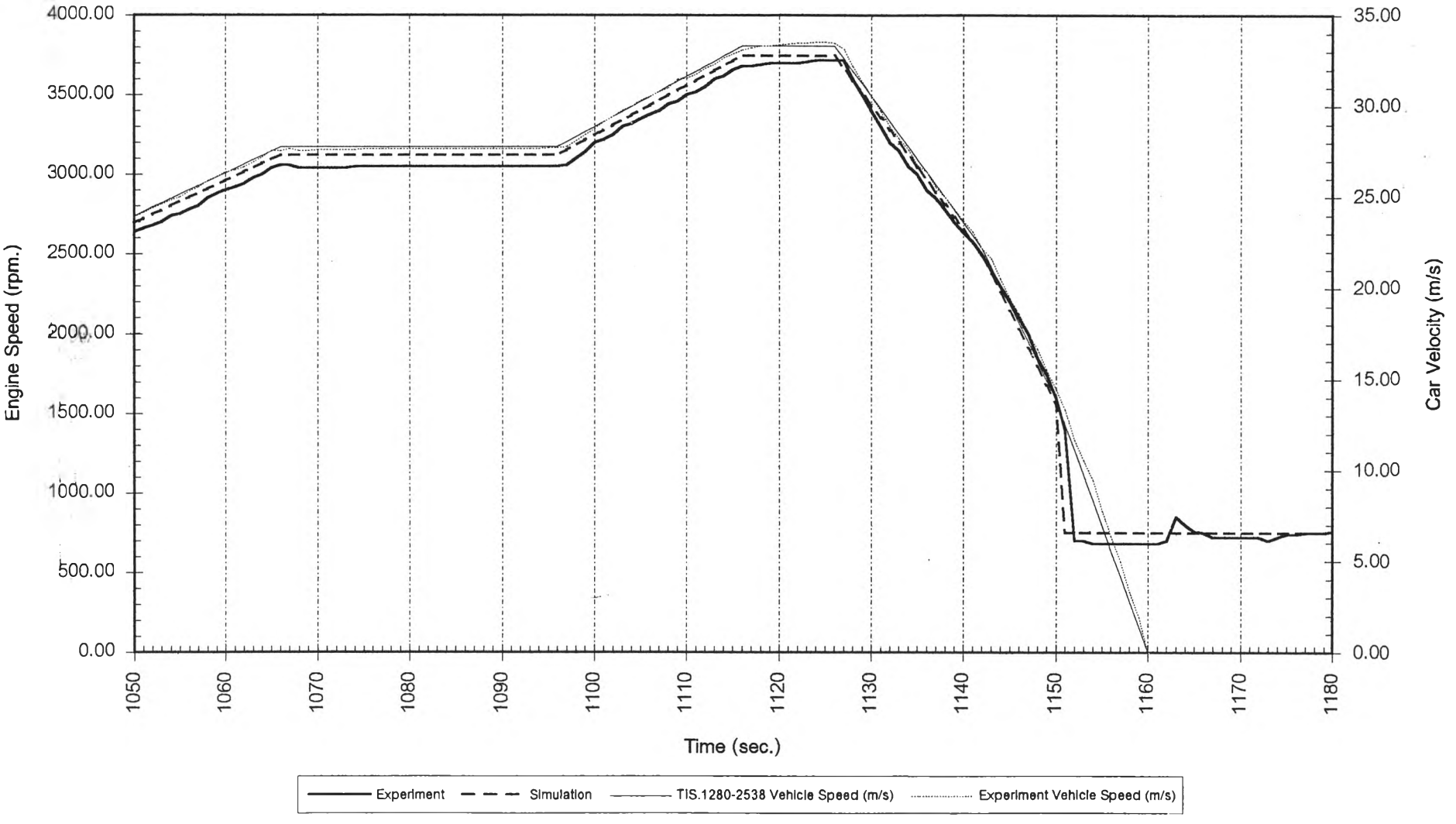
รูปที่ ซ1 (ต่อ) Compare Engine Speed from Experiment and Simulation (750-900 s.)



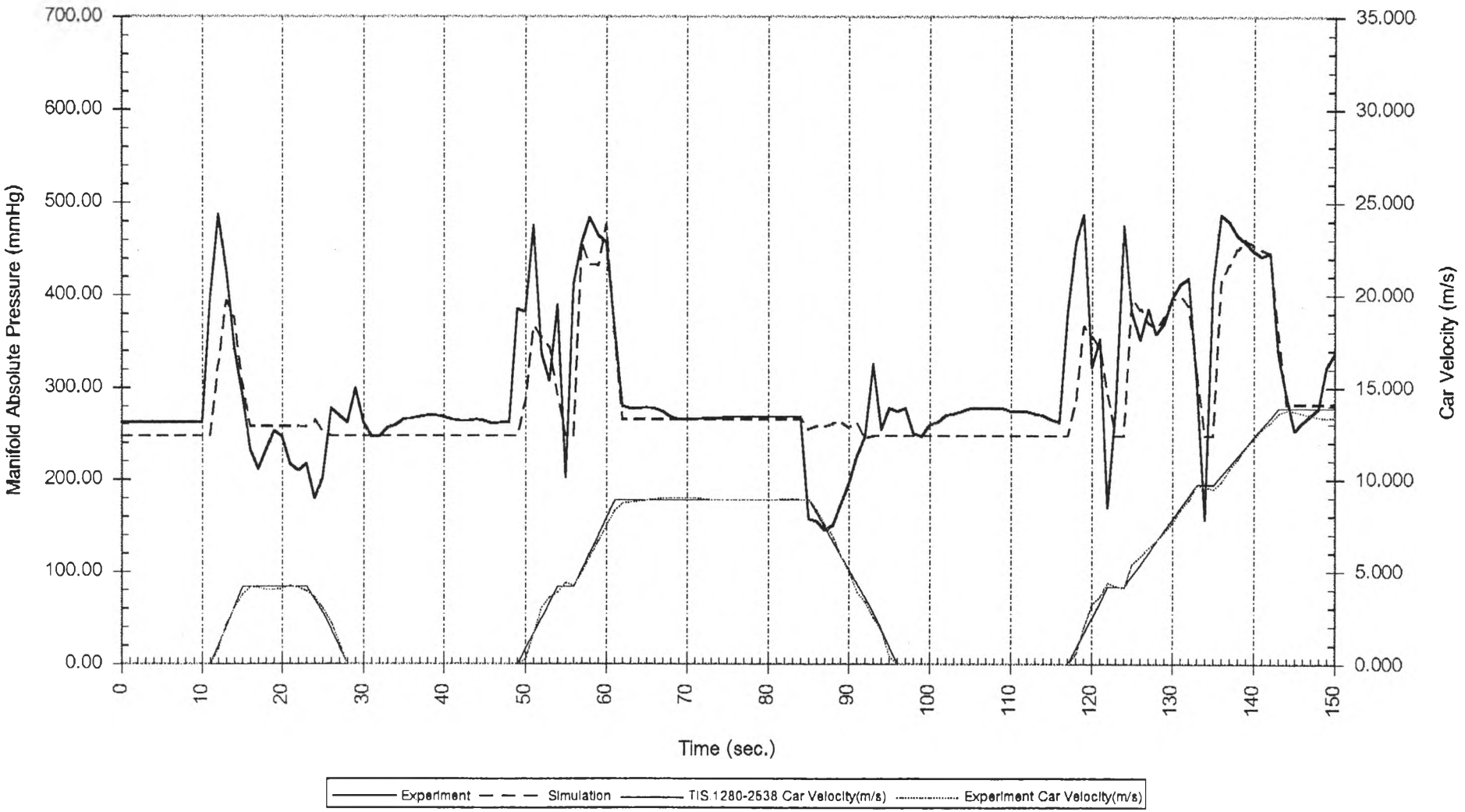
รูปที่ ซ1 (ต่อ) Compare Engine Speed from Experiment and Simulation (900-1050 s.)



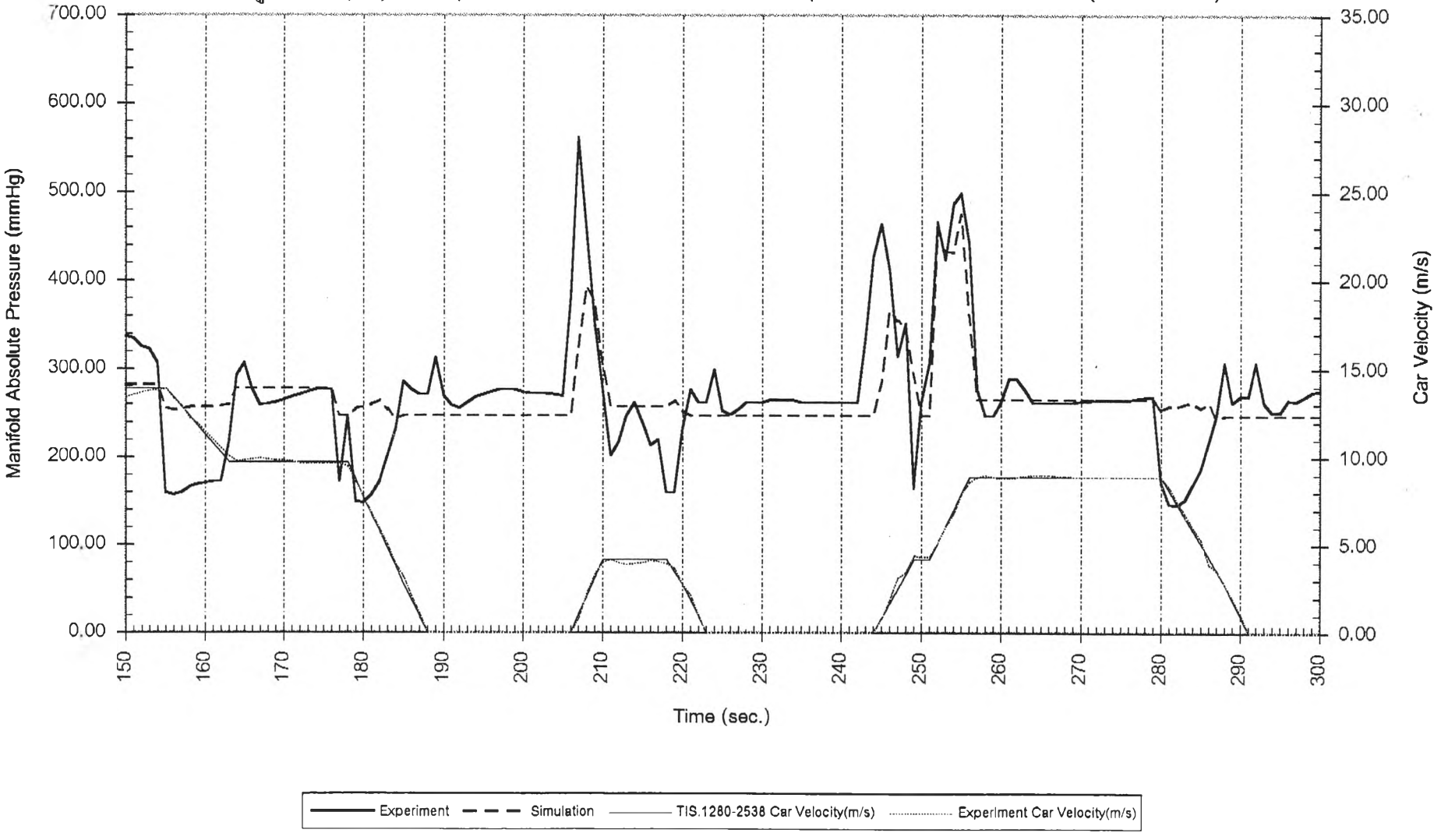
รูปที่ ช1 (ต่อ) Compare Engine Speed from Experiment and Simulation (1050-1180 s.)



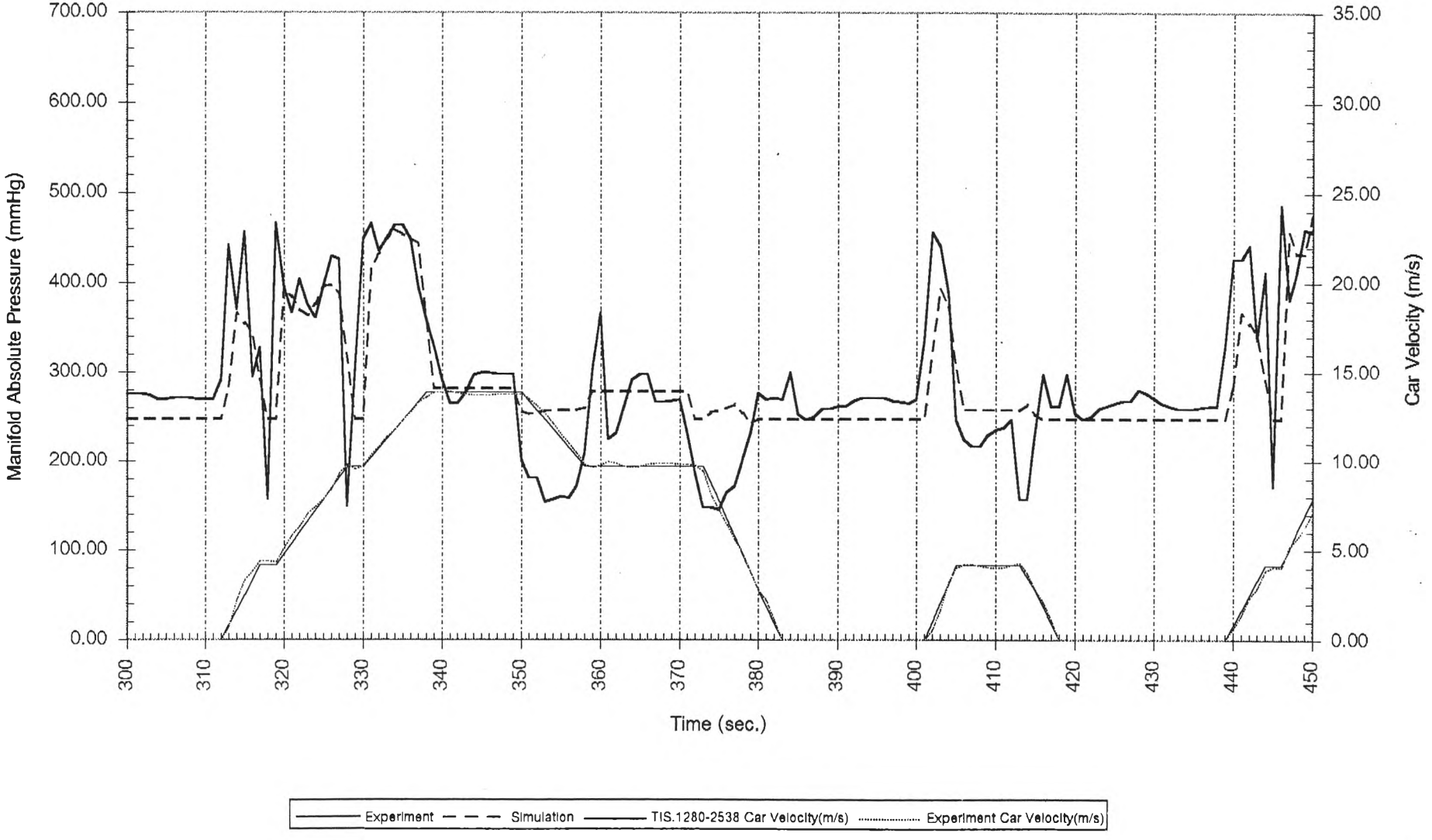
รูปที่ ซ2 Compare Manifold Pressure from Experiment and Simulation (0-150 sec.)



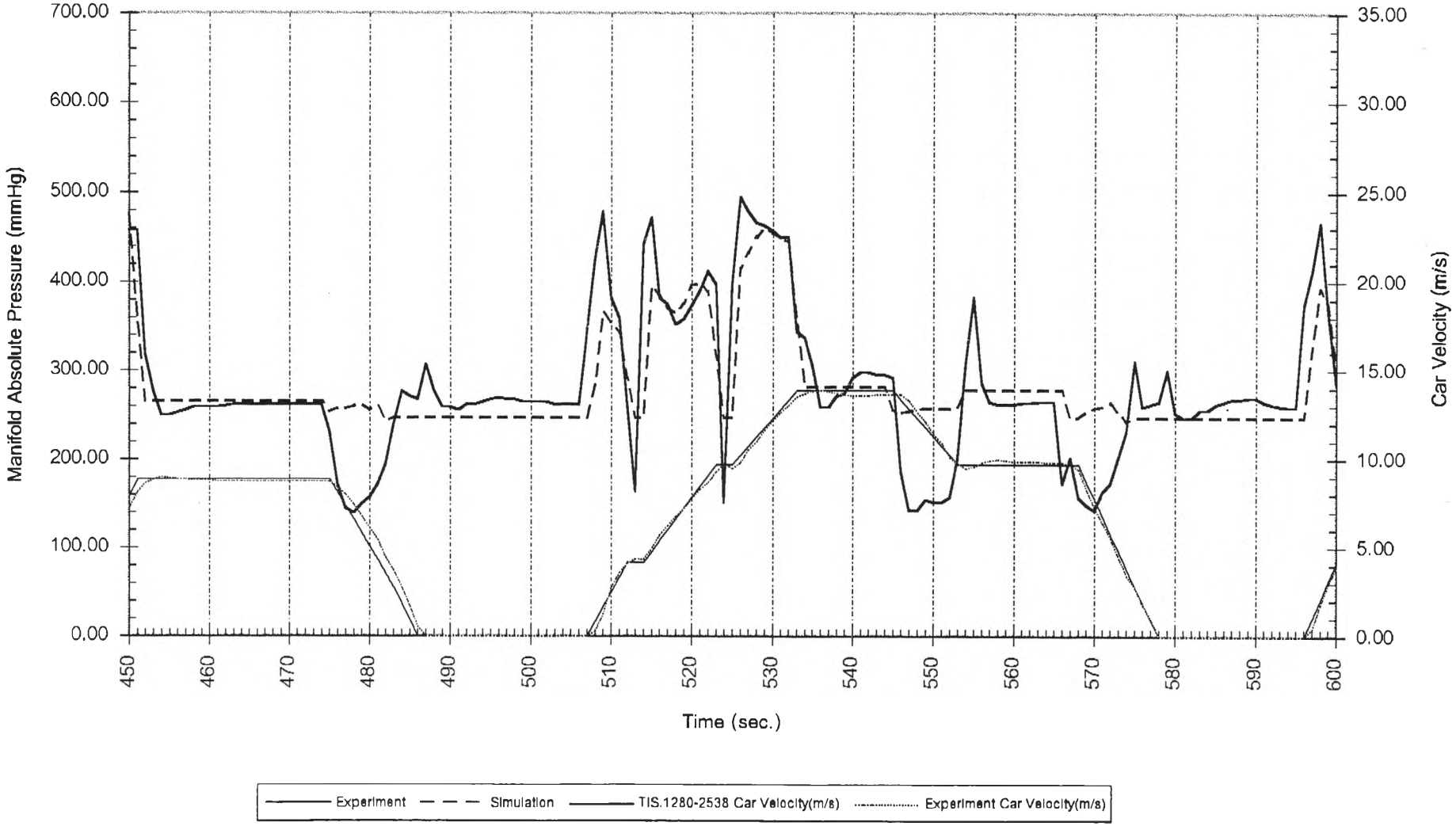
รูปที่ ซ2 (ต่อ) Compare Manifold Pressure from Experiment and Simulation (150-300 s.)



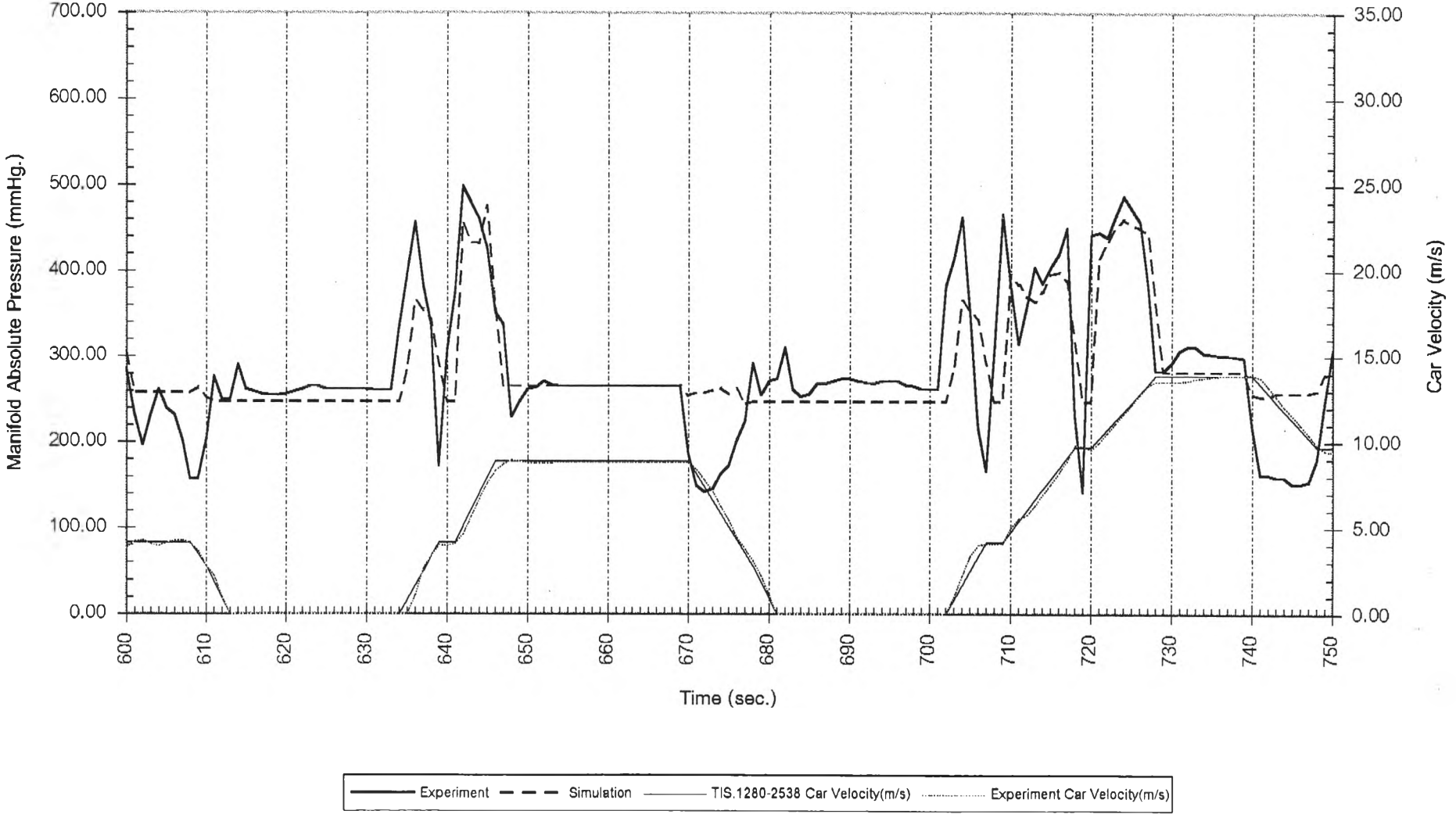
รูปที่ ซ2 (ต่อ) Compare Manifold Pressure from Experiment and Simulation (300-450 s.)



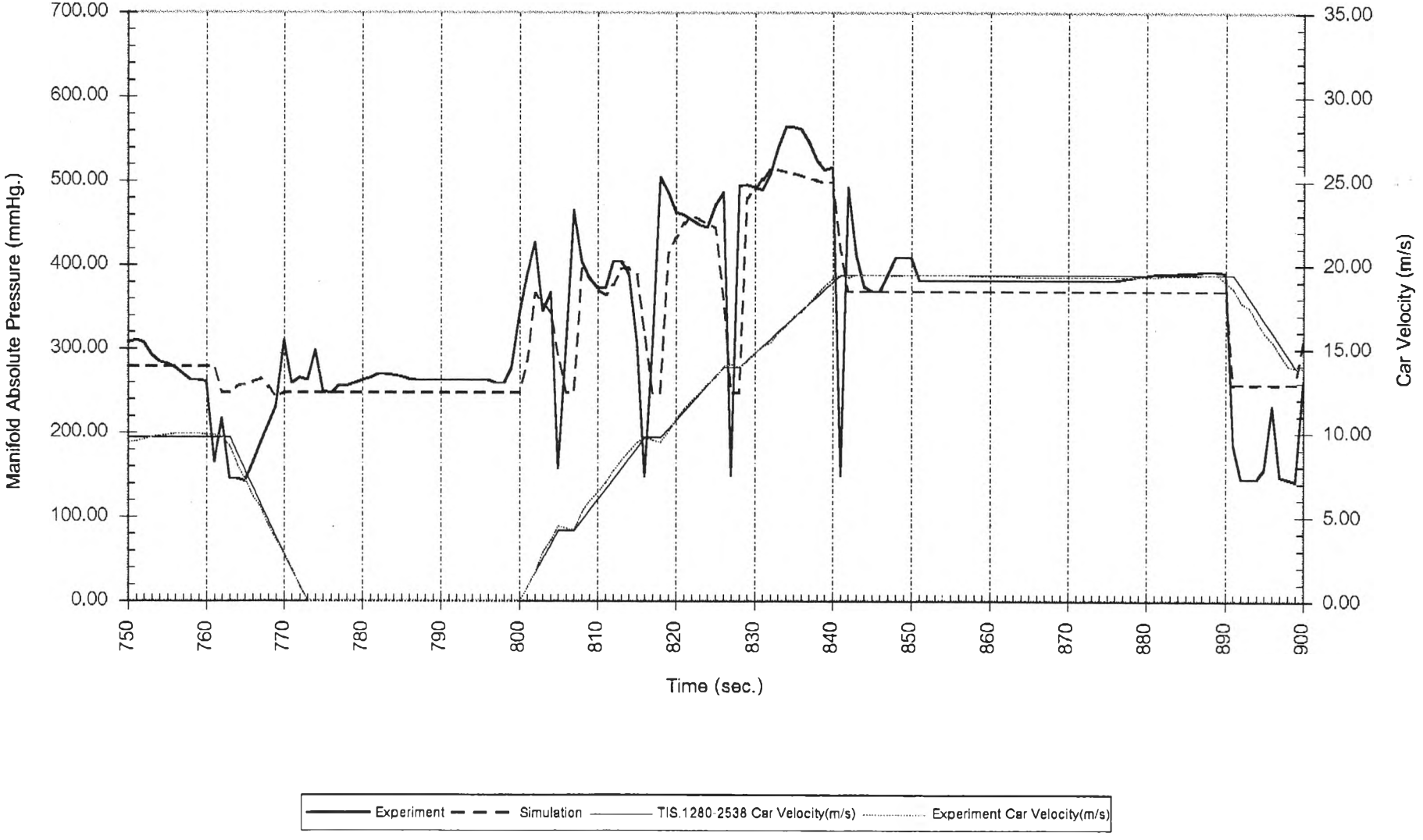
รูปที่ ซ2 (ต่อ) Compare Manifold Pressure from Experiment and Simulation (450-600 s.)



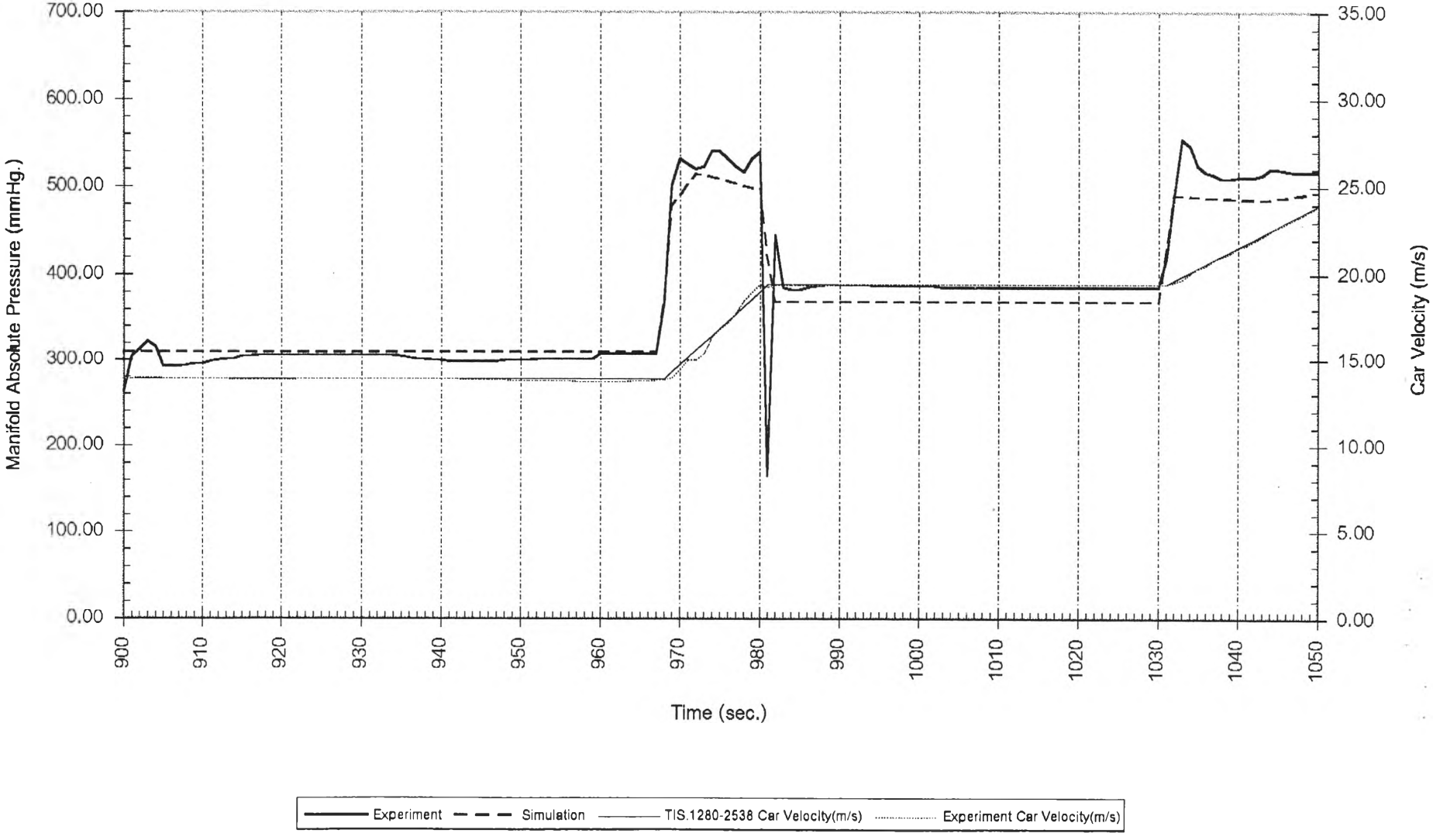
รูปที่ ซ2 (ต่อ) Compare Manifold Pressure from Experiment and Simulation (600-750 s.)



รูปที่ ซ2 (ต่อ) Compare Manifold Pressure from Experiment and Simulation (750-900 s.)

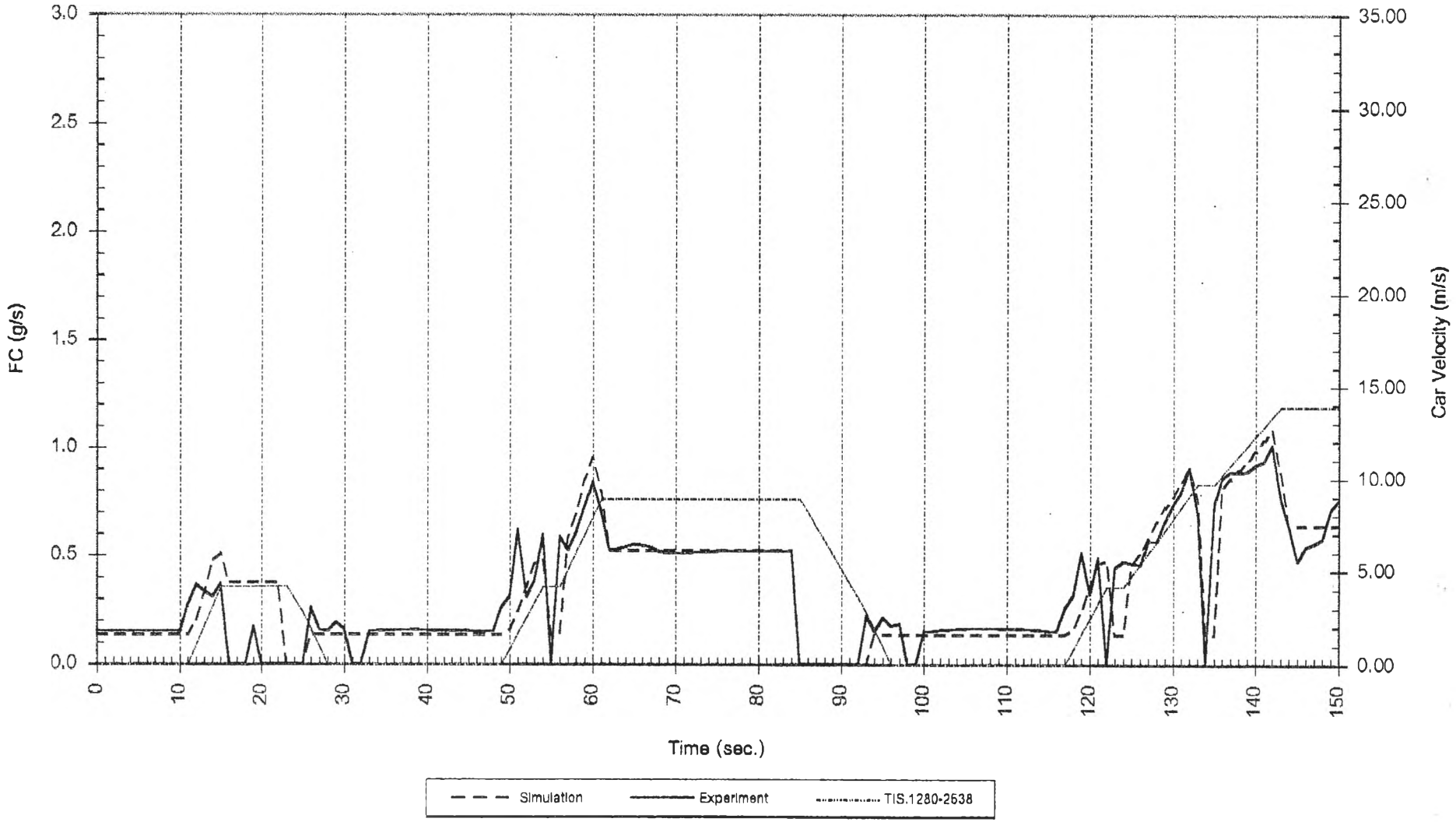


รูปที่ ซ2 (ต่อ) Compare Manifold Pressure from Experiment and Simulation (900-1050 s.)

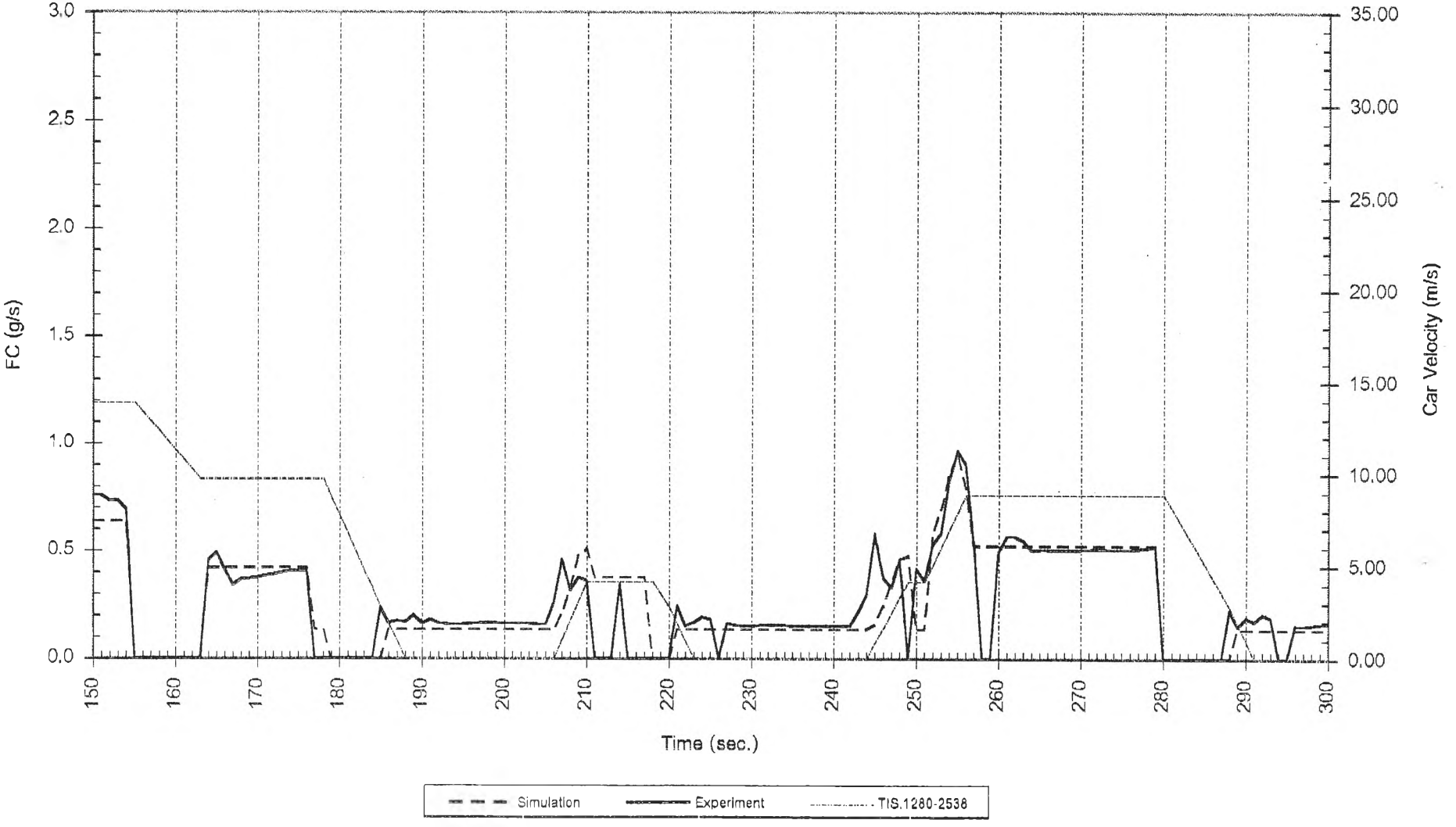


รูปที่ ซ2 (ต่อ) Compare Manifold Pressure from Experiment and Simulation (1050-1180 s.)

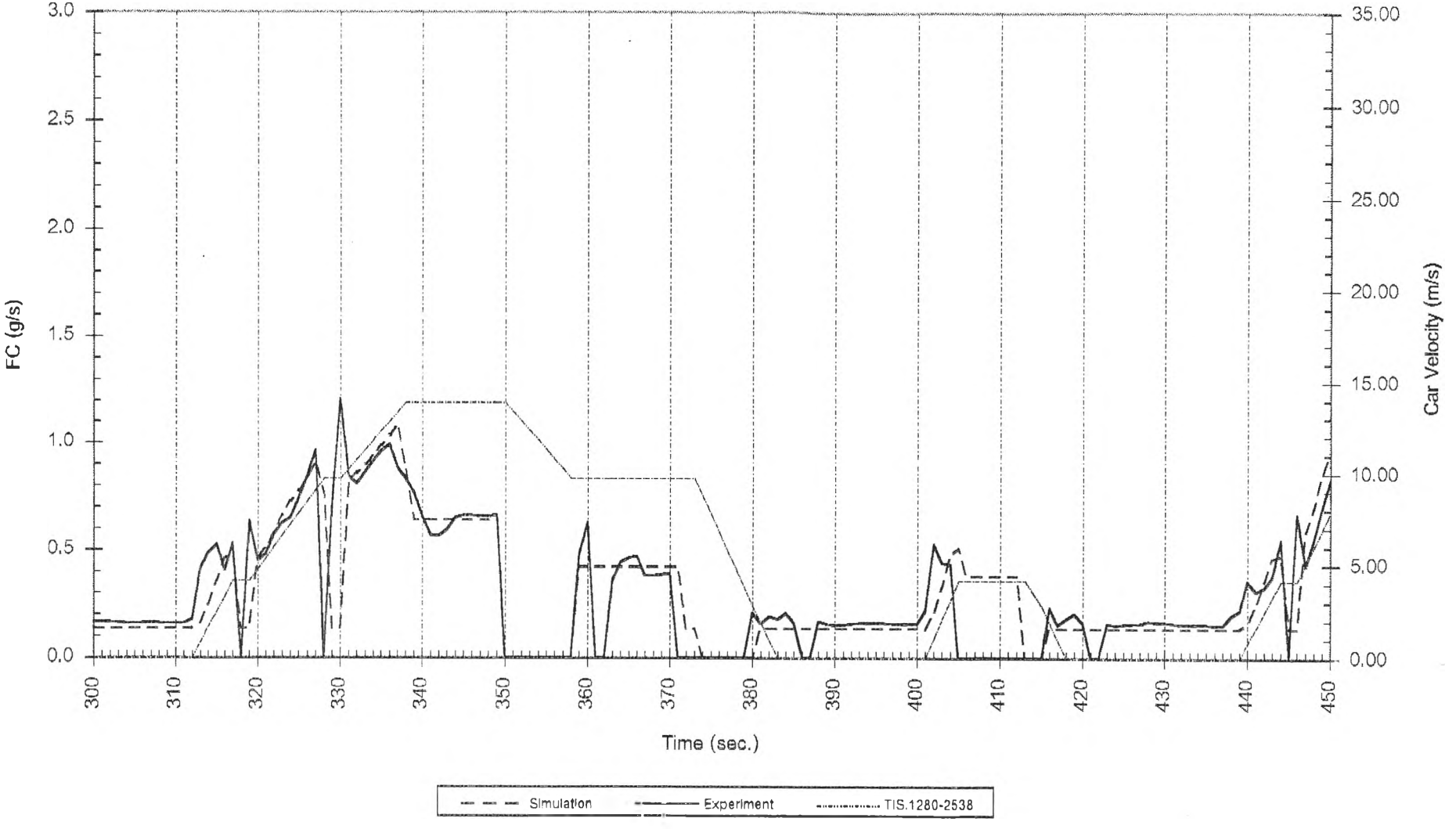
รูปที่ ซ3 Compare FC from Experiment and Simulation (0-150 s.)



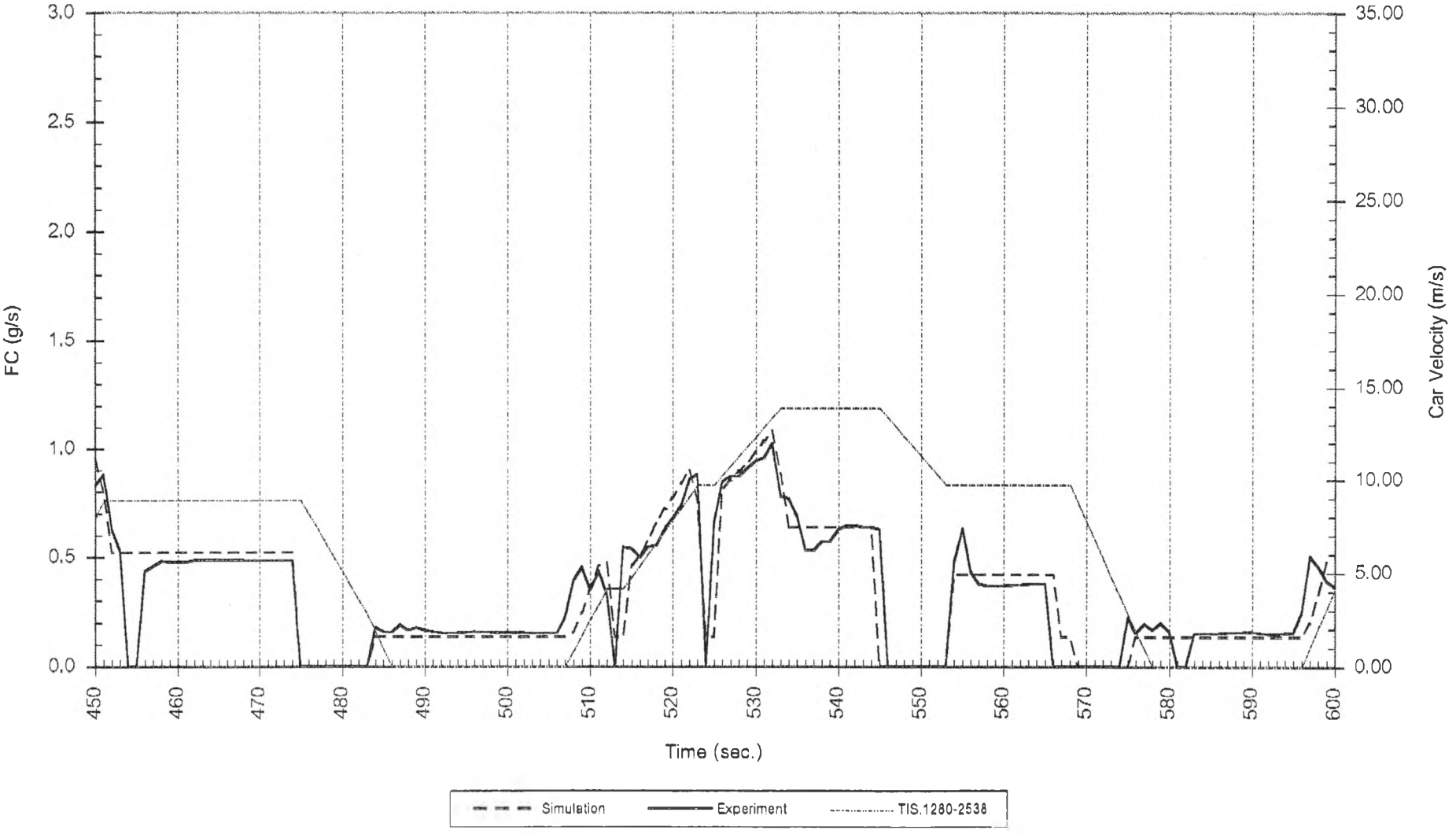
รูปที่ ซ3 (ต่อ) Compare FC from Experiment and Simulation (150-300 s.)



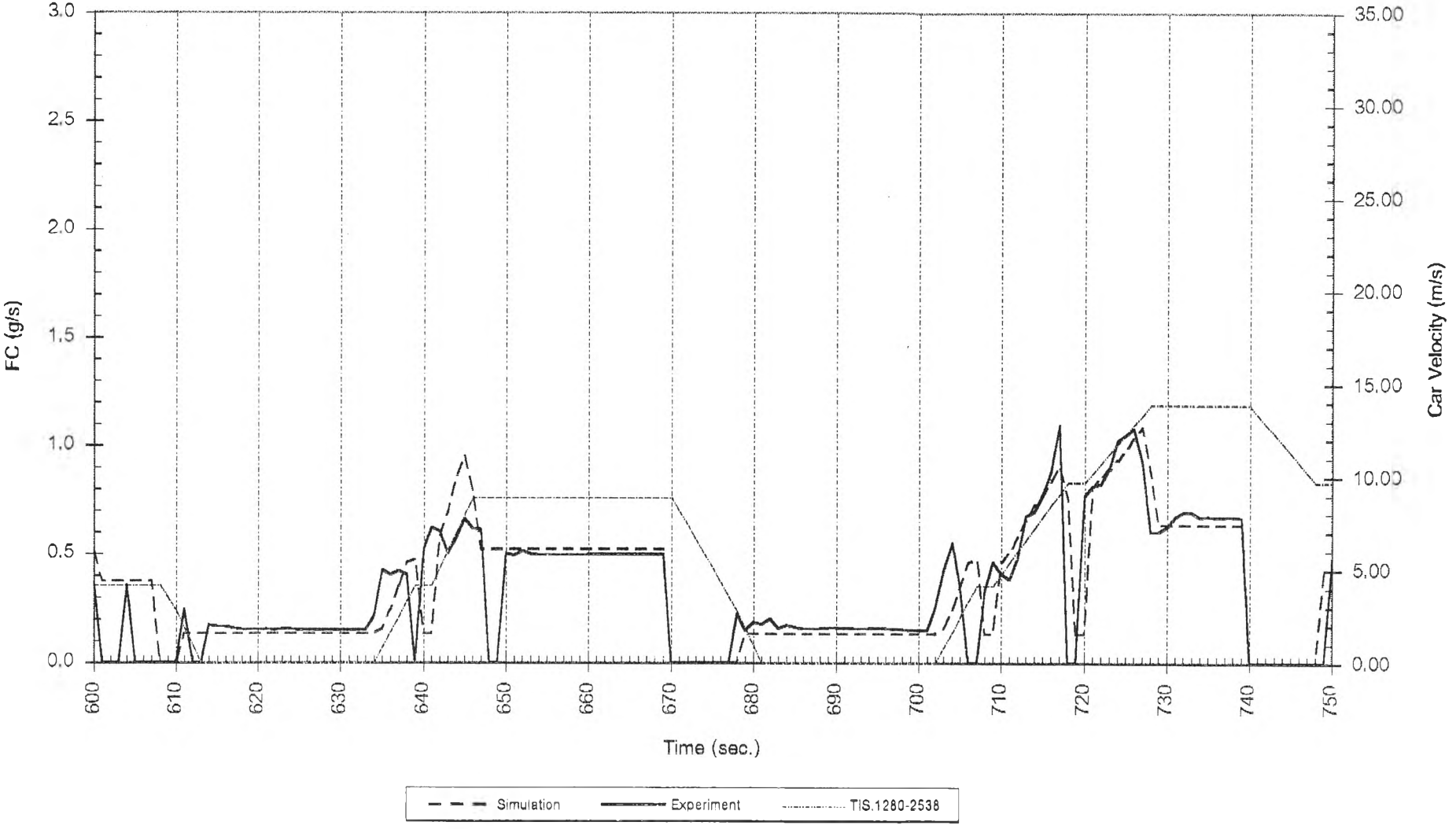
รูปที่ ซ3 (ต่อ) Compare FC from Experiment and Simulation (300-450 s.)



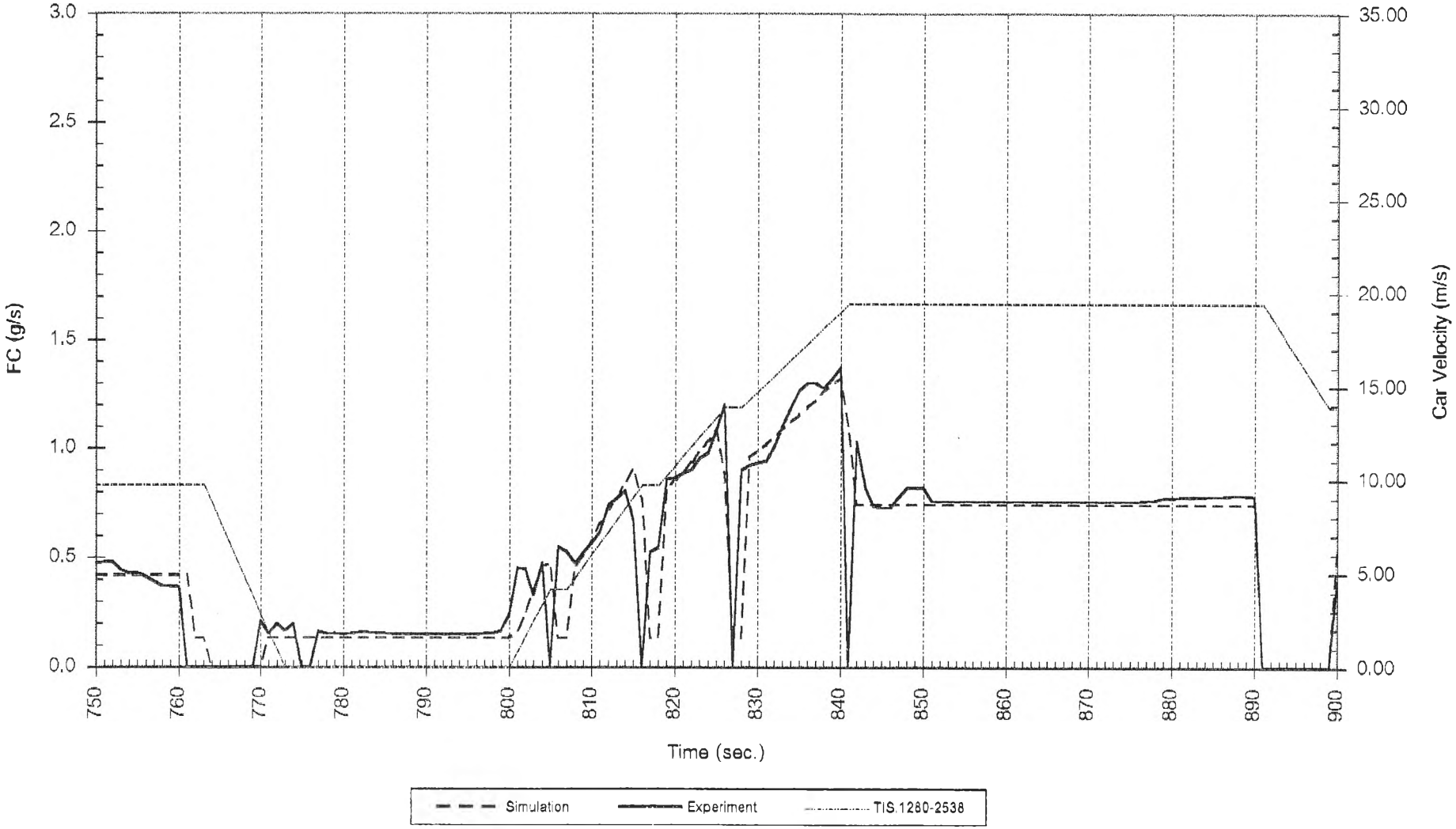
รูปที่ ซ3 (ต่อ) Compare FC from Experiment and Simulation (450-600 s.)



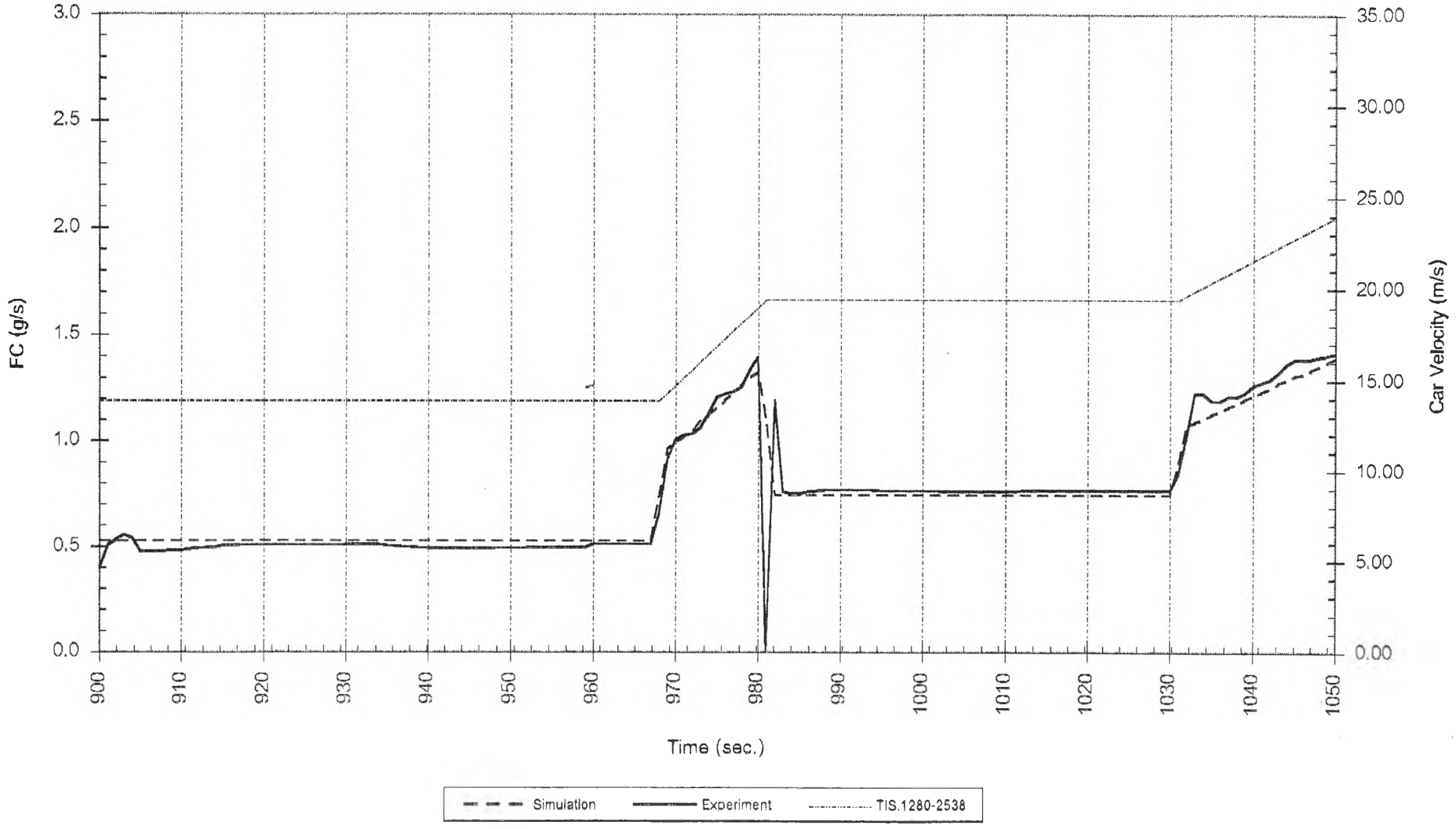
รูปที่ ซ3 (ต่อ) Compare FC from Experiment and Simulation (600-750 s.)



รูปที่ ฃ3 (ต่อ) Compare FC from Experiment and Simulation (750-900 s.)

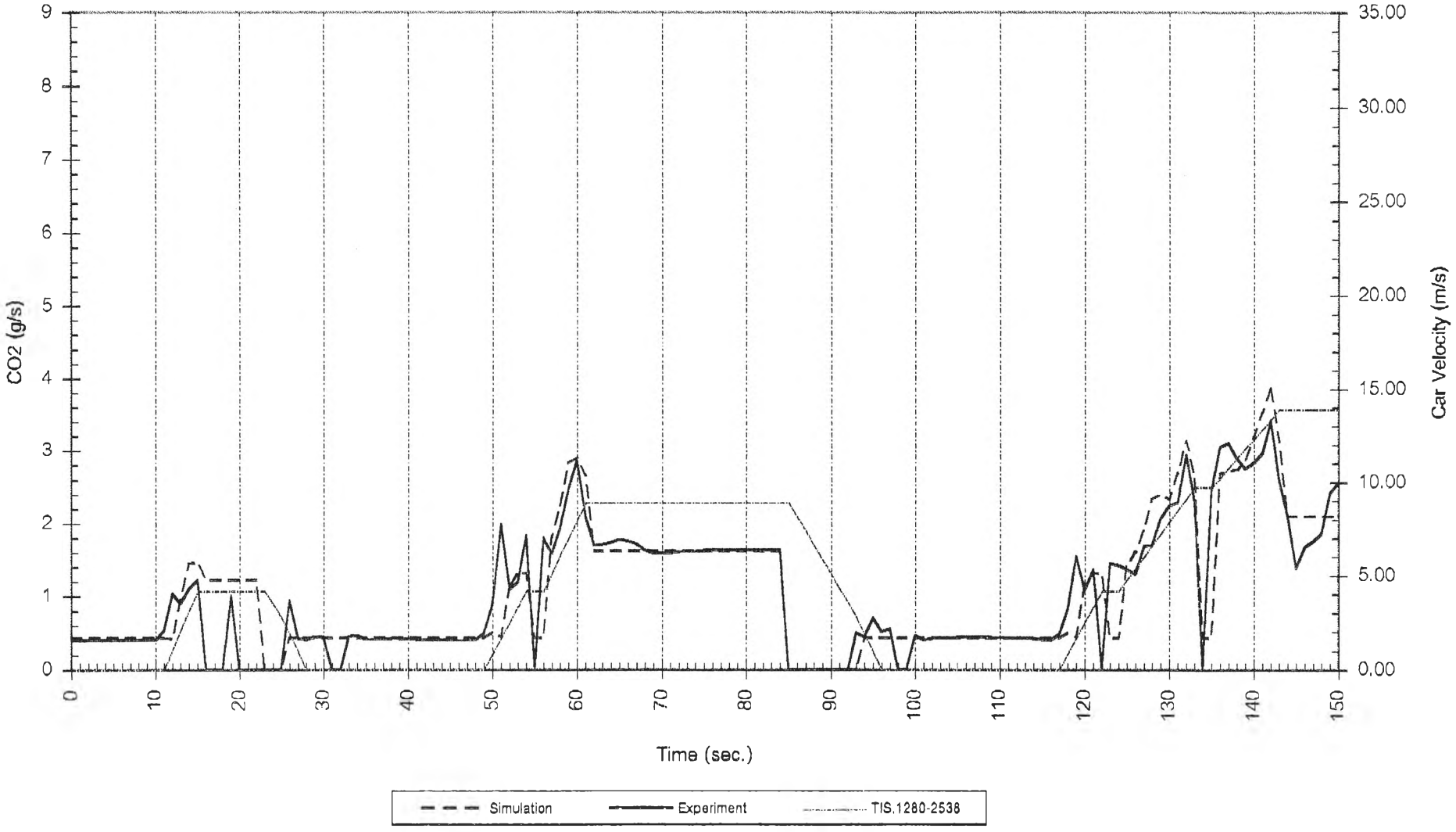


รูปที่ ซ3 (ต่อ) Compare FC from Experiment and Simulation (900-1050 s.)

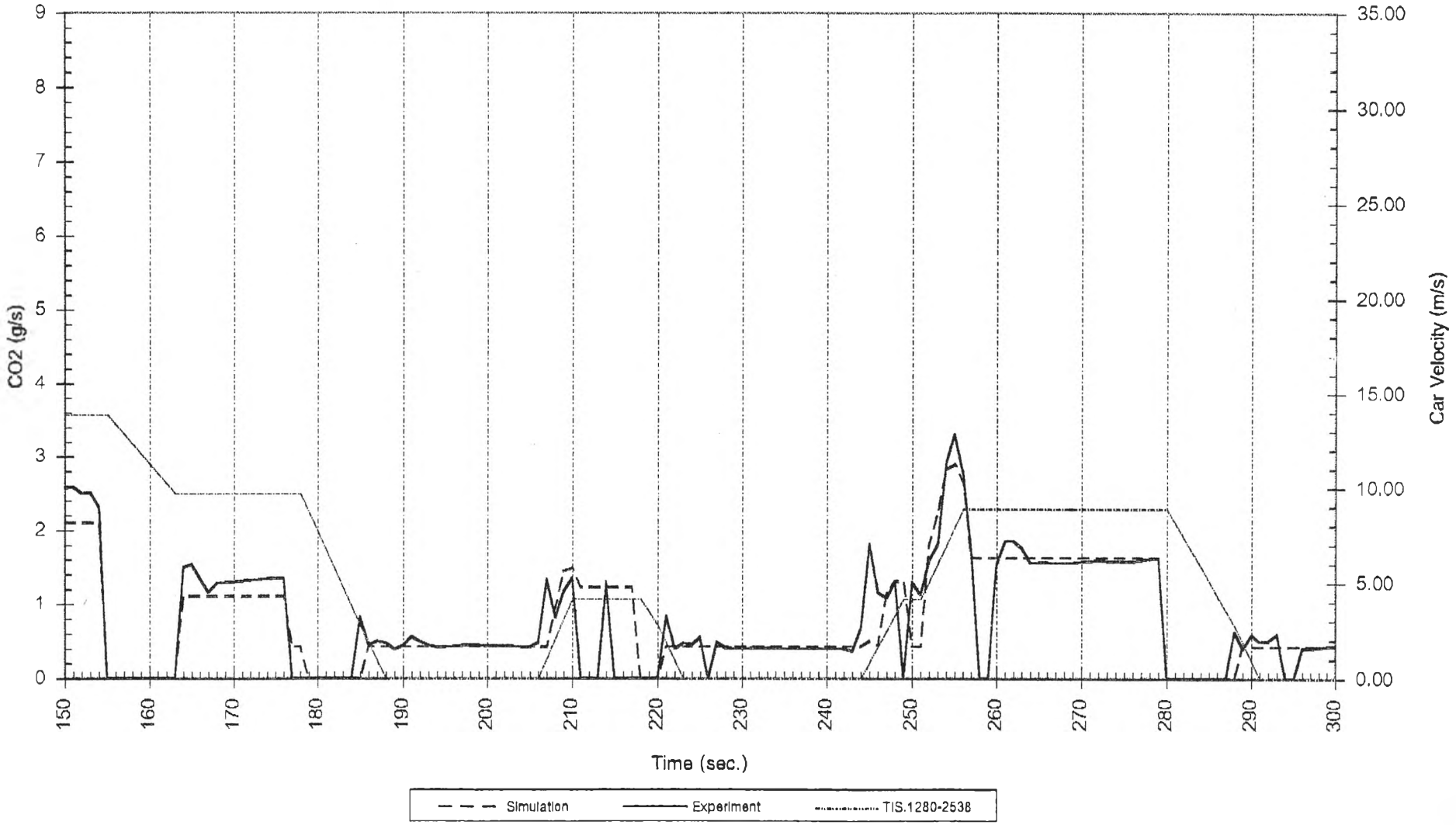


รูปที่ ซ3 (ต่อ) Compare FC from Experiment and Simulation (1050-1180 s.)

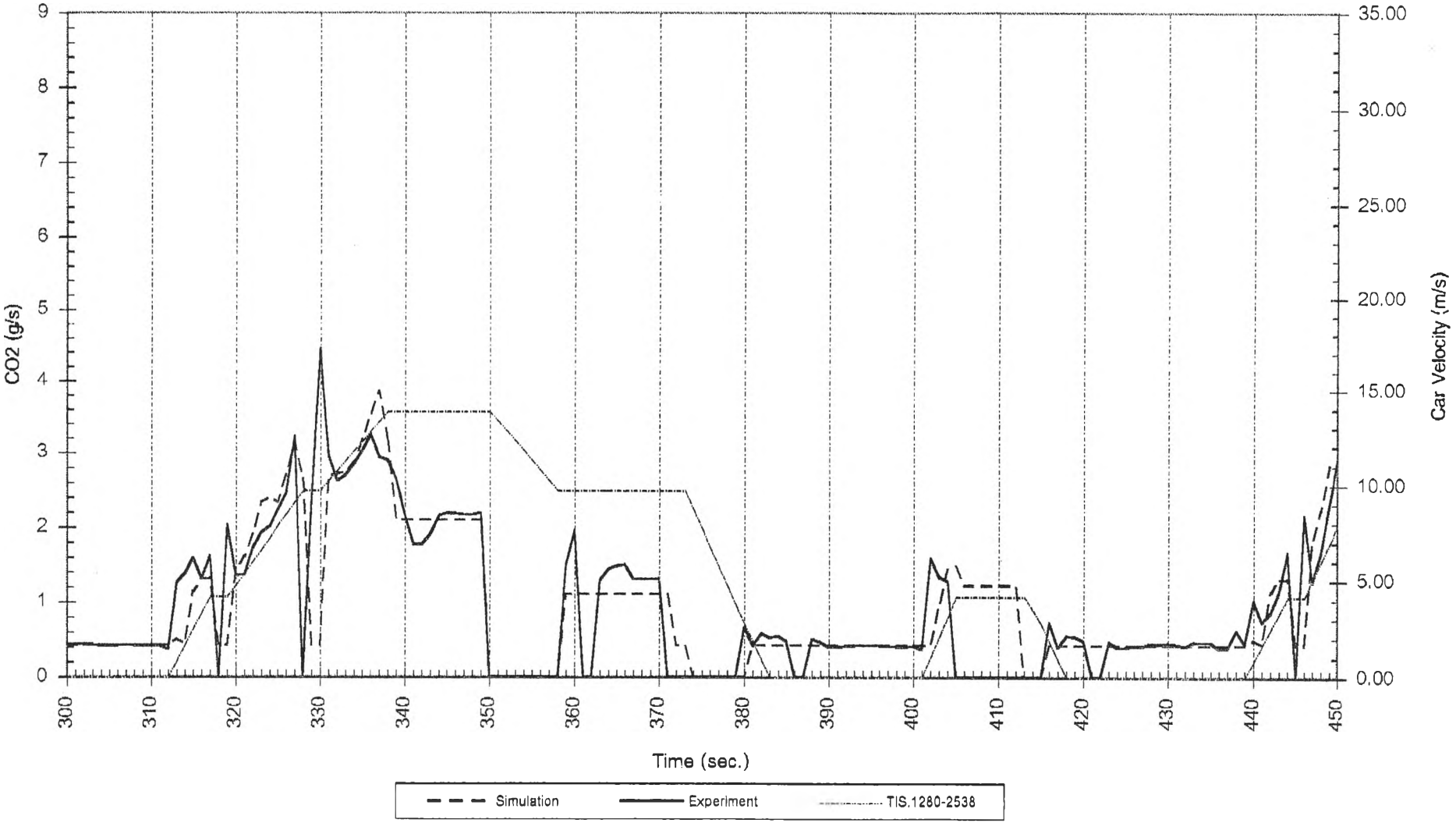
รูปที่ ซ4 Compare CO2 from Experiment and Simulation (0-150 s.)



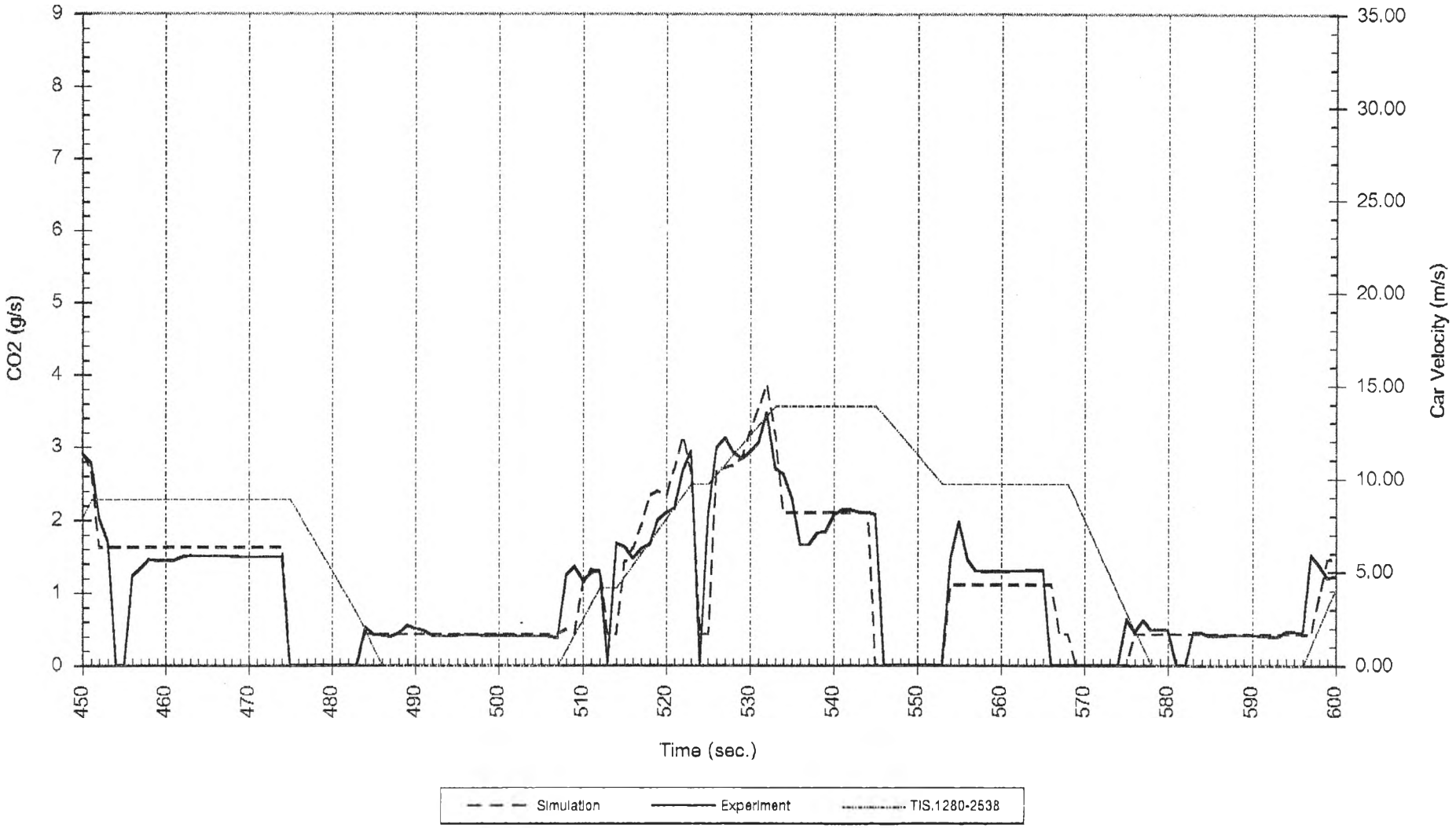
รูปที่ ซ4 (ต่อ) Compare CO2 from Experiment and Simulation (150-300 s.)



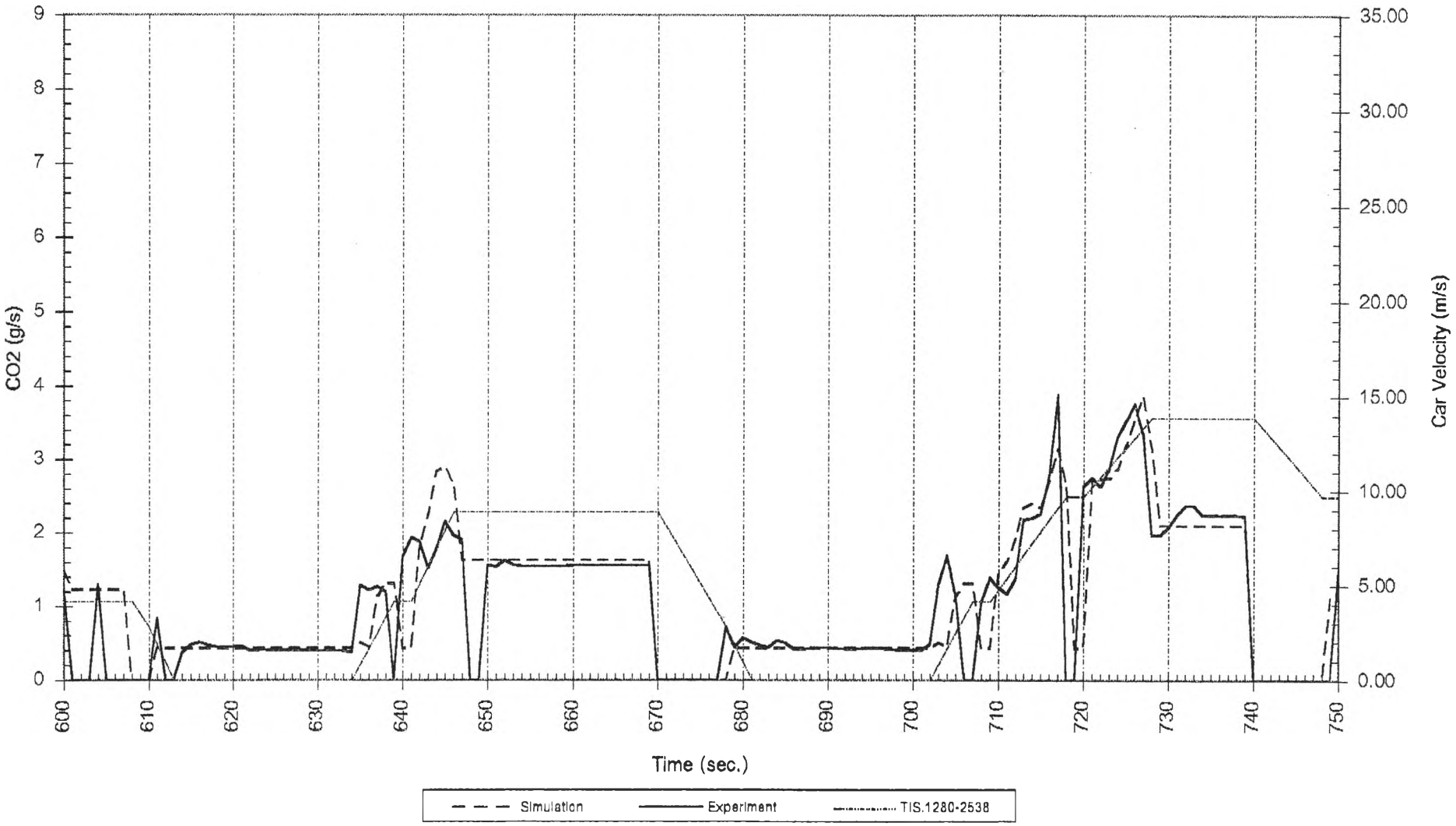
รูปที่ ซ4 (ต่อ) Compare CO2 from Experiment and Simulation (300-450 s.)



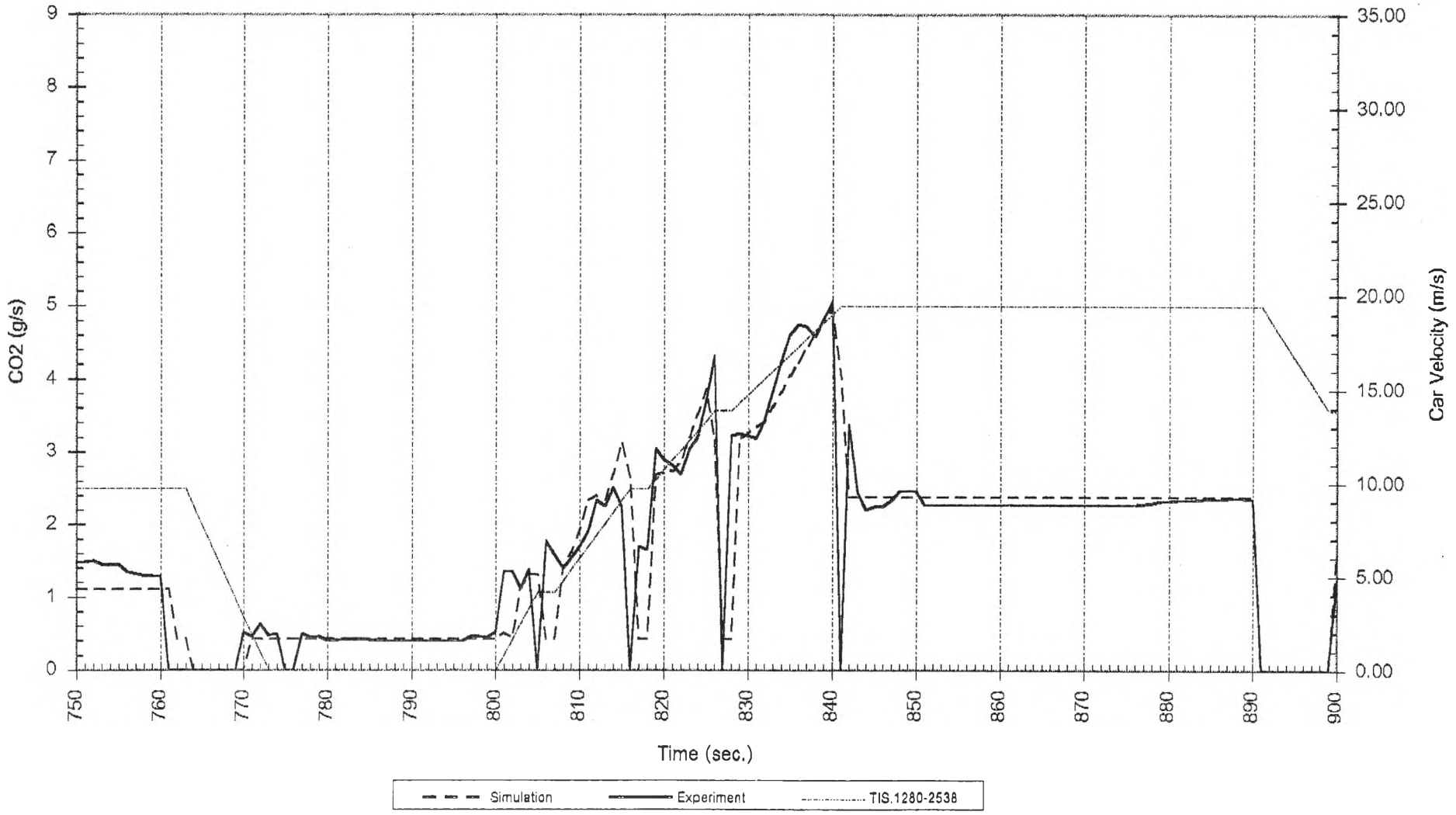
รูปที่ ซ4 (ต่อ) Compare CO2 from Experiment and Simulation (450-600 s.)



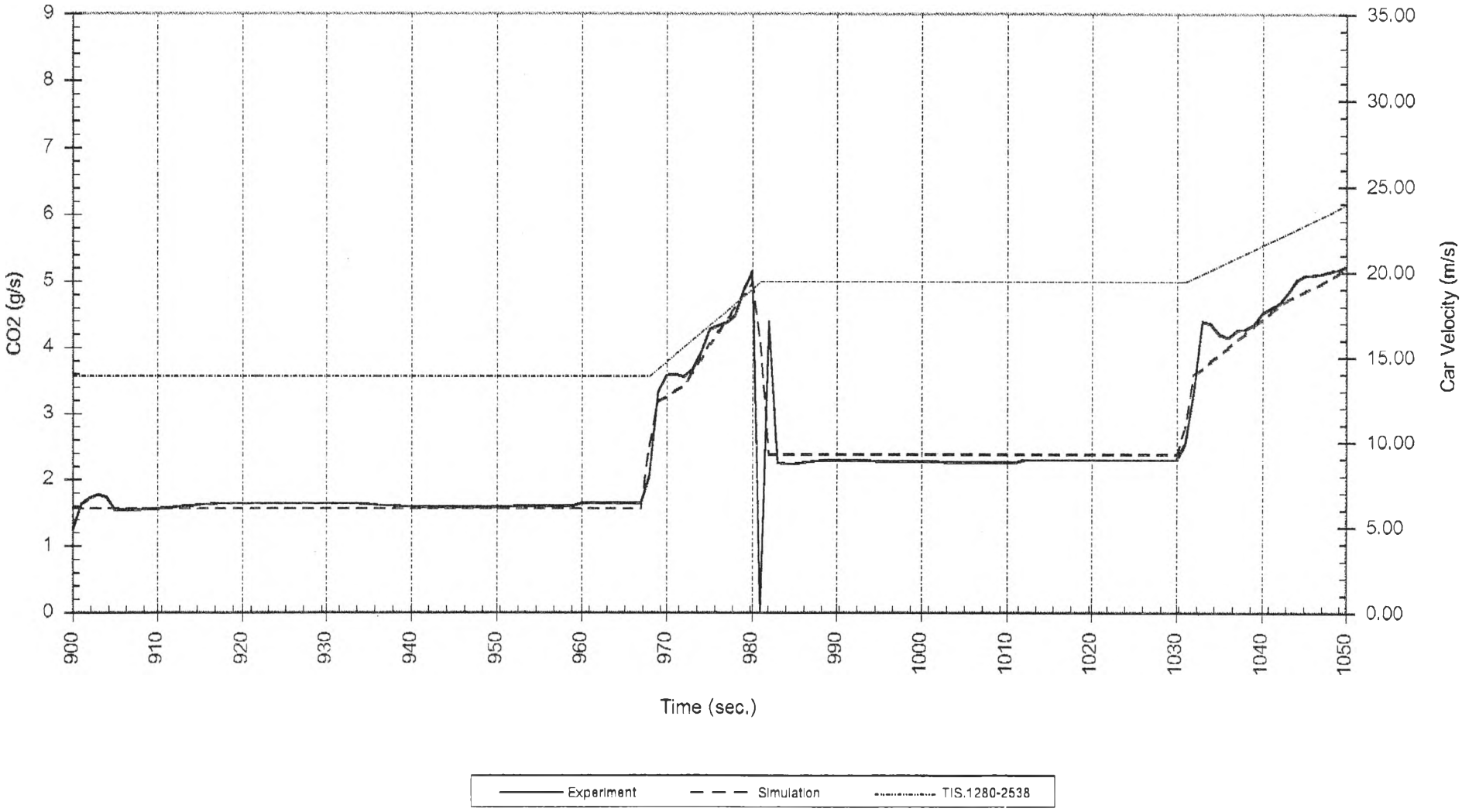
รูปที่ ซ4 (ต่อ) Compare CO2 from Experiment and Simulation (600-750 s.)



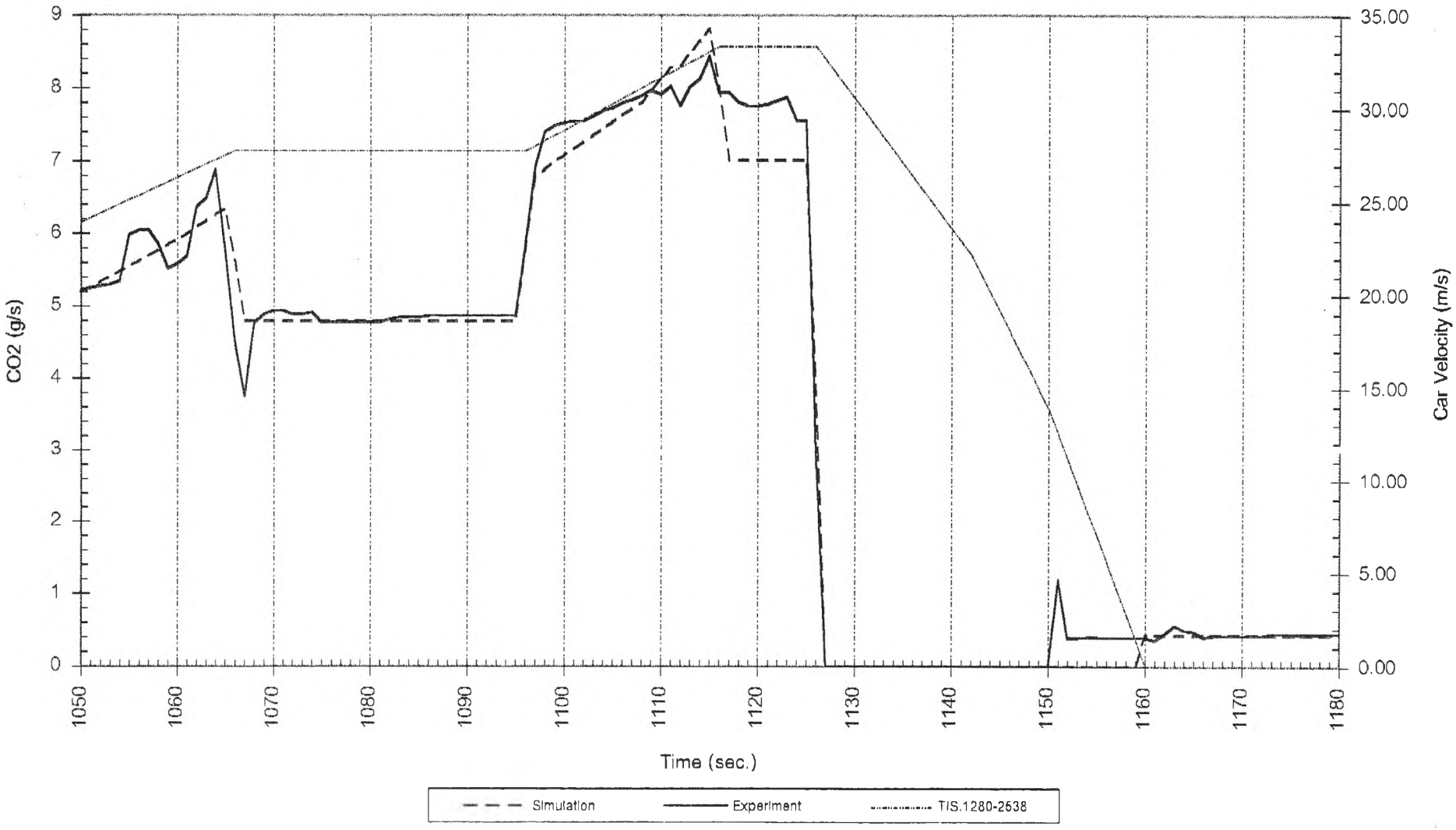
รูปที่ ซ4 (ต่อ) Compare CO2 from Experiment and Simulation (750-900 s.)



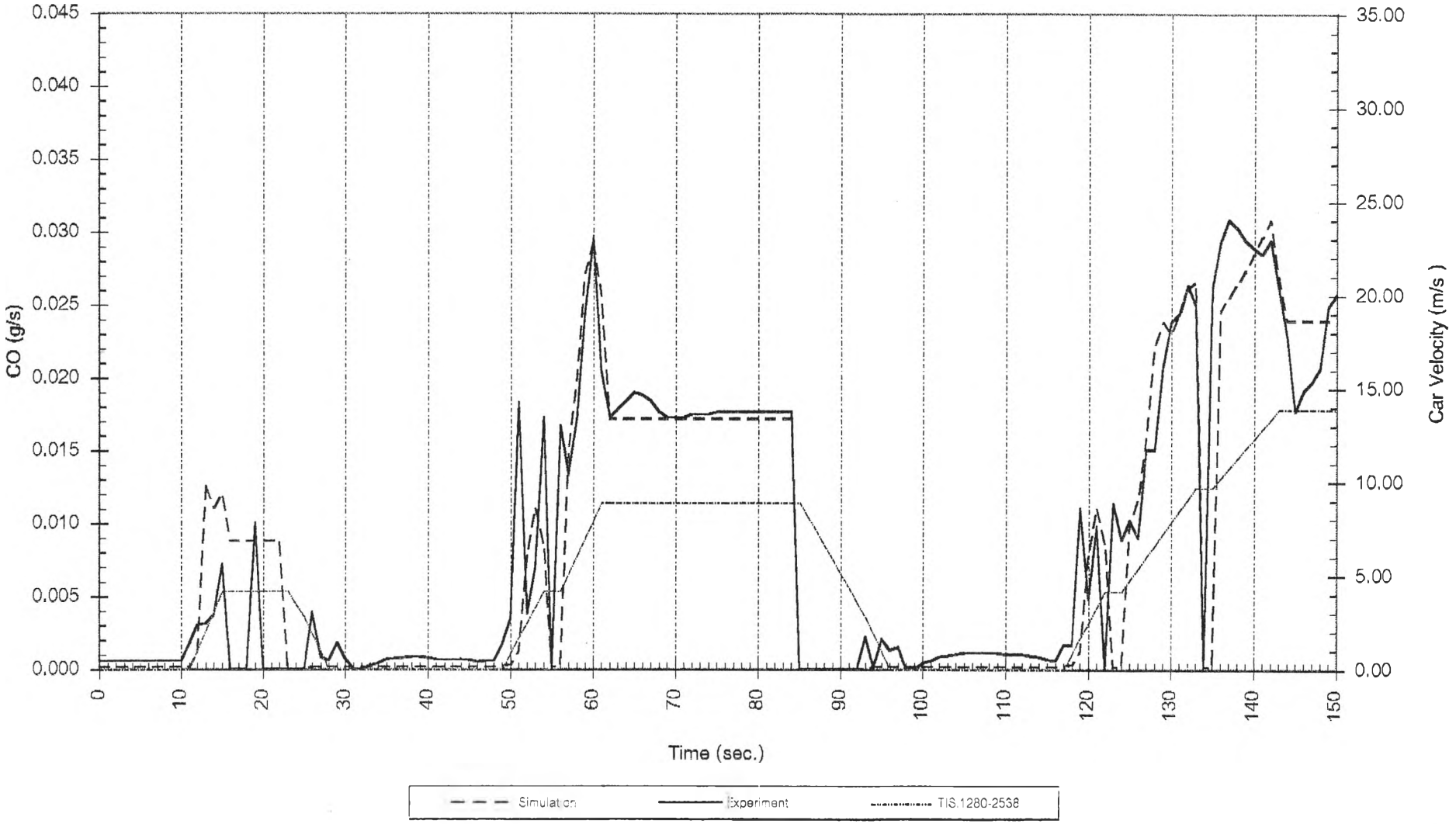
รูปที่ ซ4 (ต่อ) Compare CO2 from Experiment and Simulation (900-1050 s.)



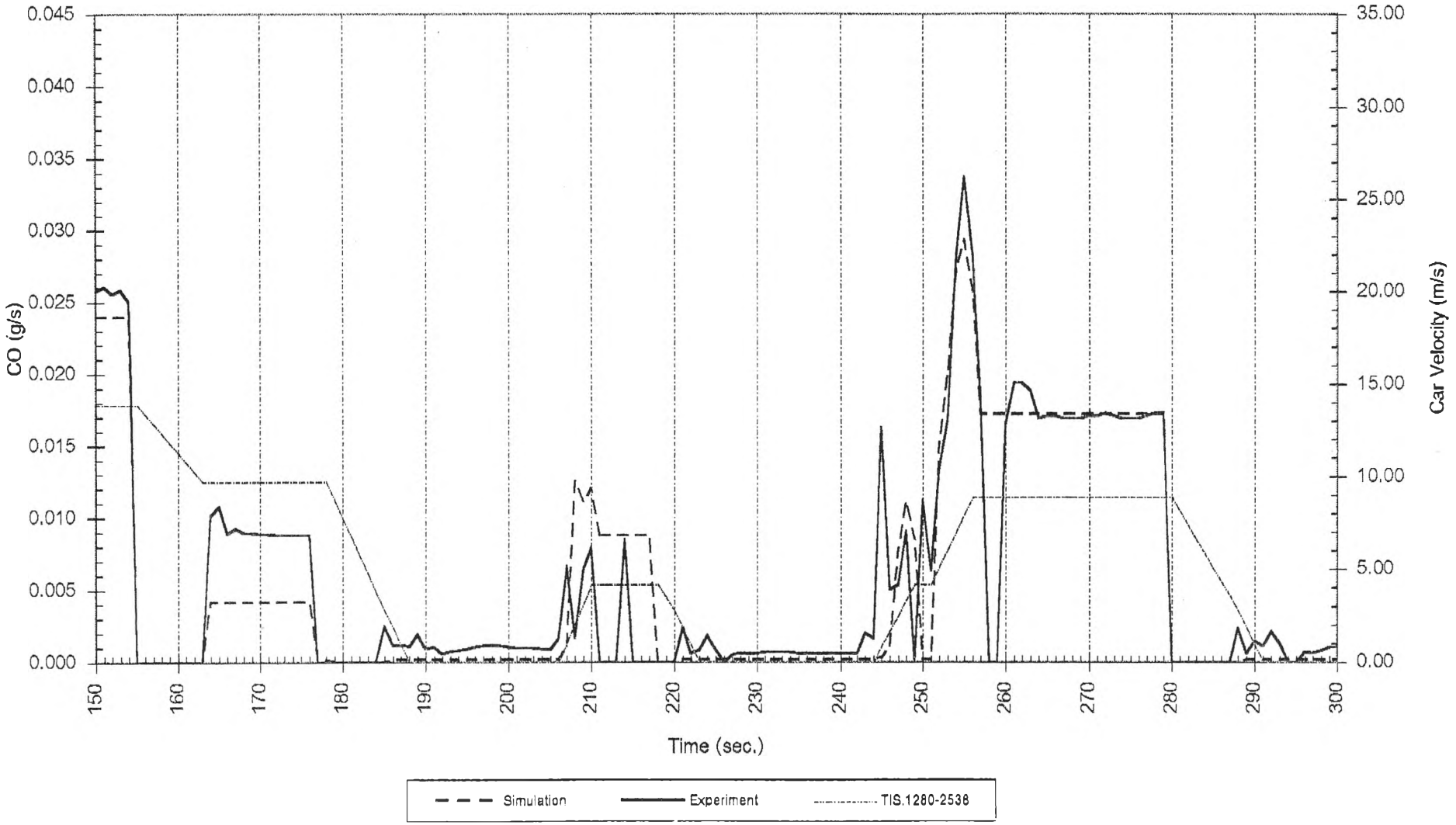
รูปที่ ซ4 (ต่อ) Compare CO2 from Experiment and Simulation (1050-1180 s.)



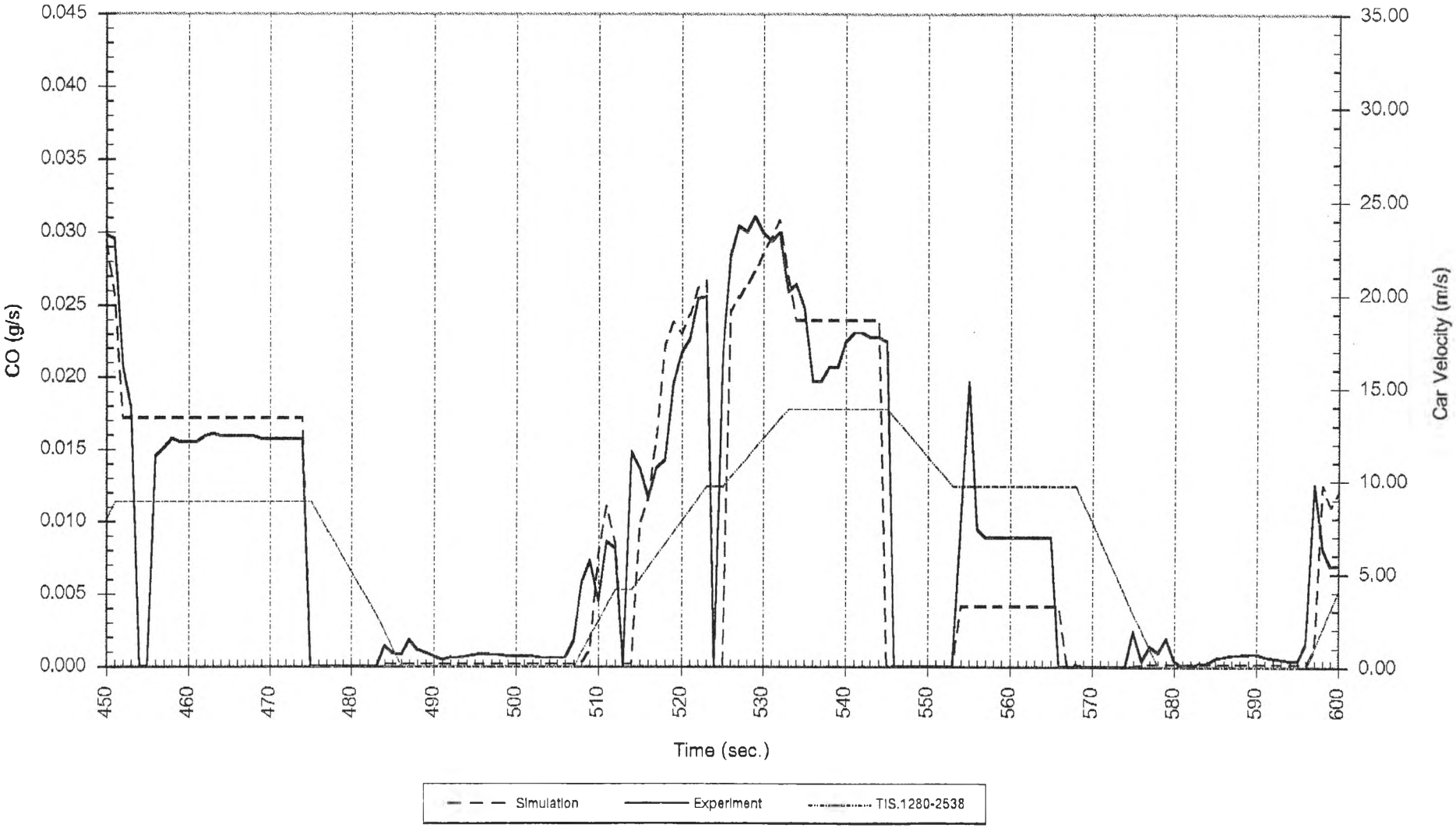
รูปที่ ซ5 Compare CO from Experiment and Simulation (0-150 s.)



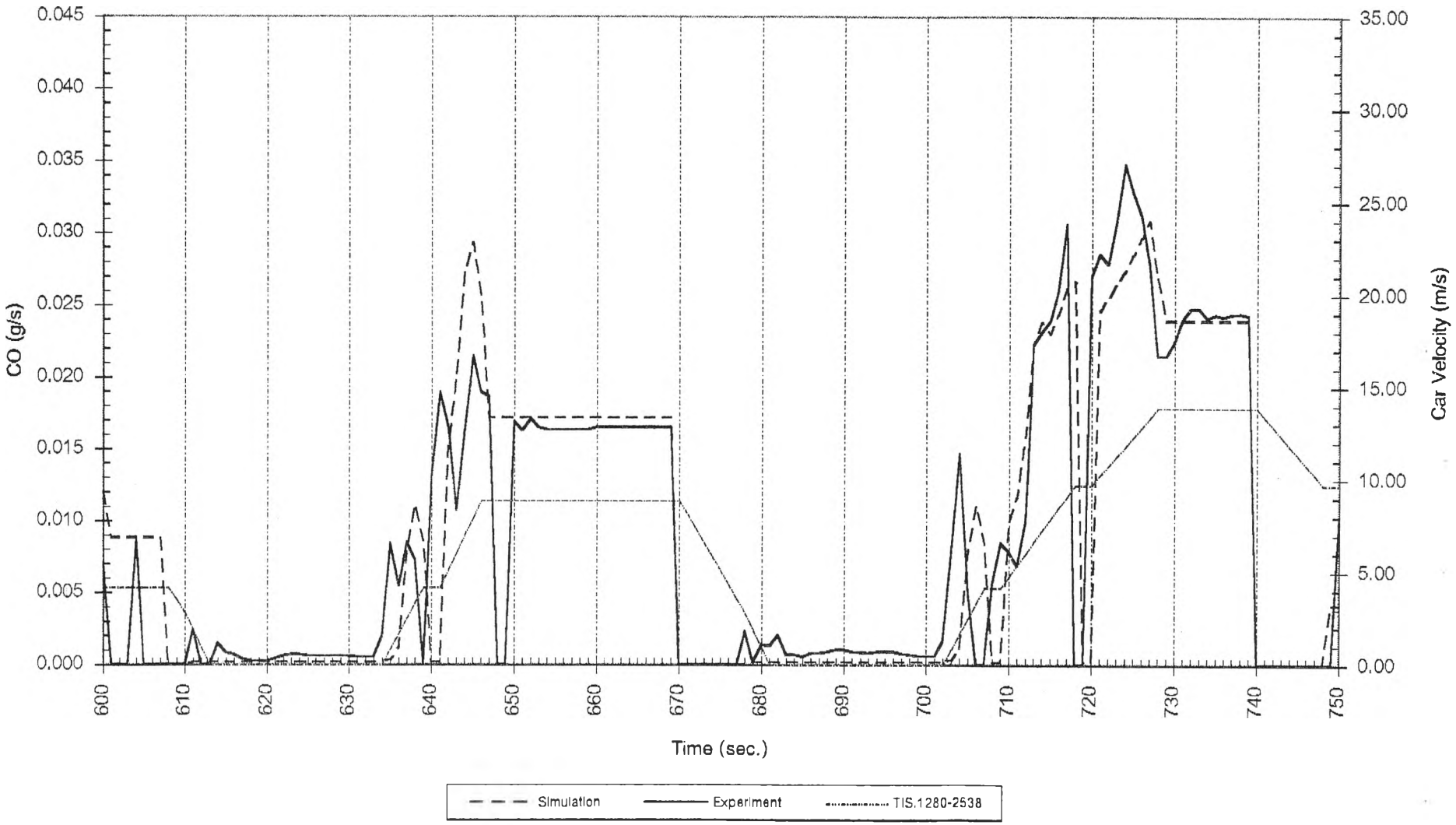
รูปที่ ซ5 (ต่อ) Compare CO from Experiment and Simulation (150-300 s.)



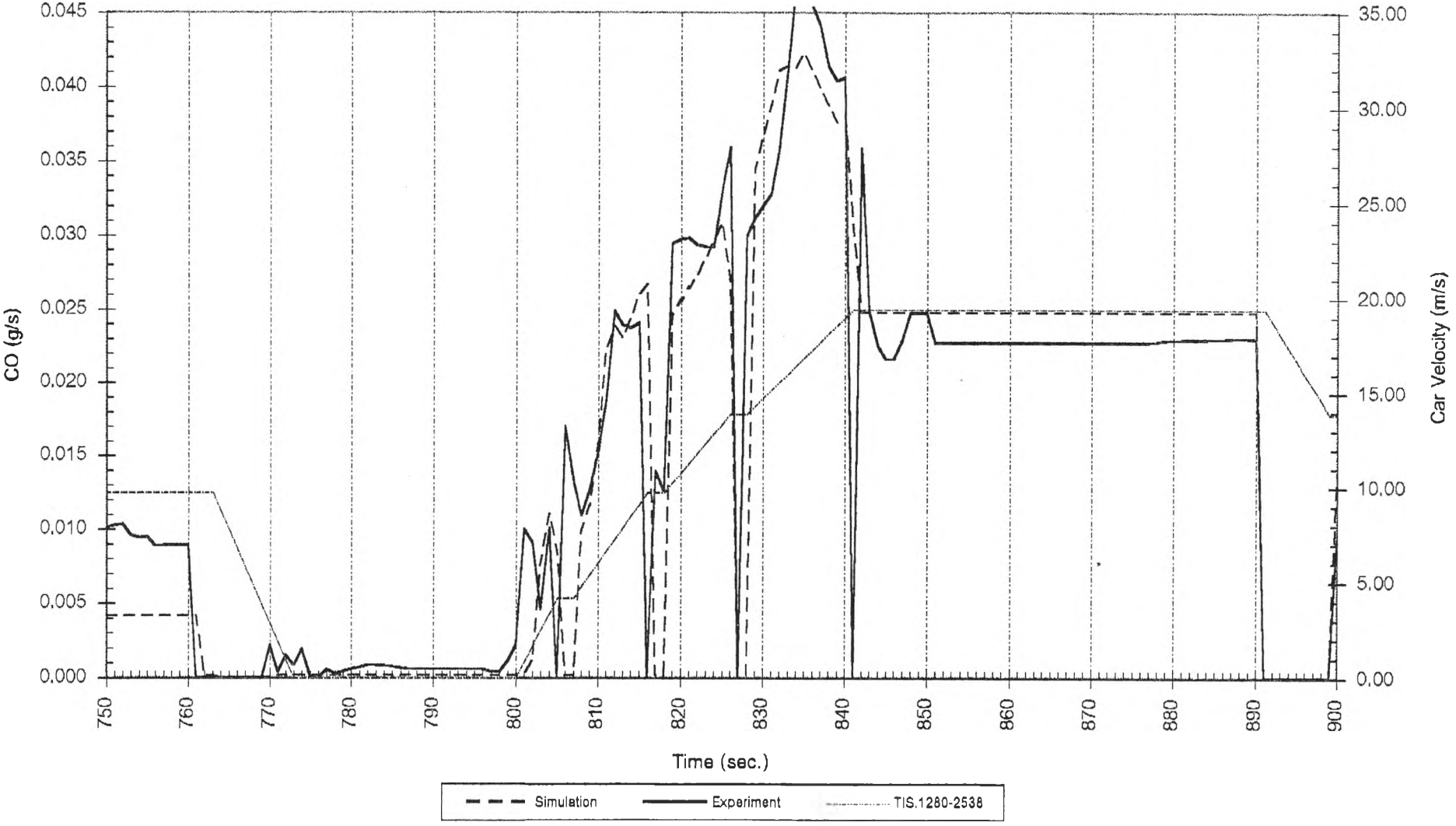
รูปที่ ซ5 (ต่อ) Compare CO from Experiment and Simulation (450-600 s.)



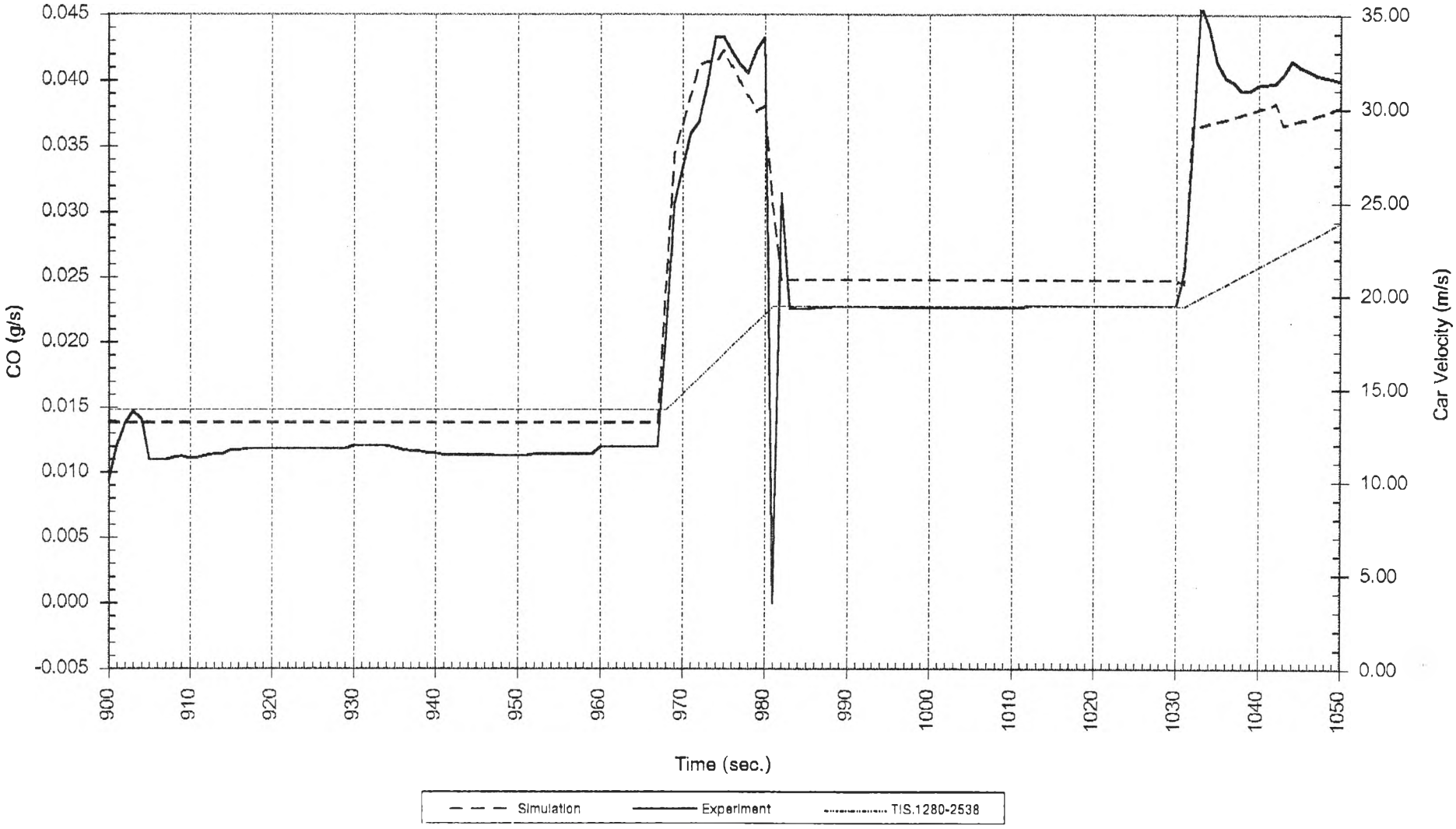
รูปที่ ซ5 (ต่อ) Compare CO from Experiment and Simulation (600-750 s.)



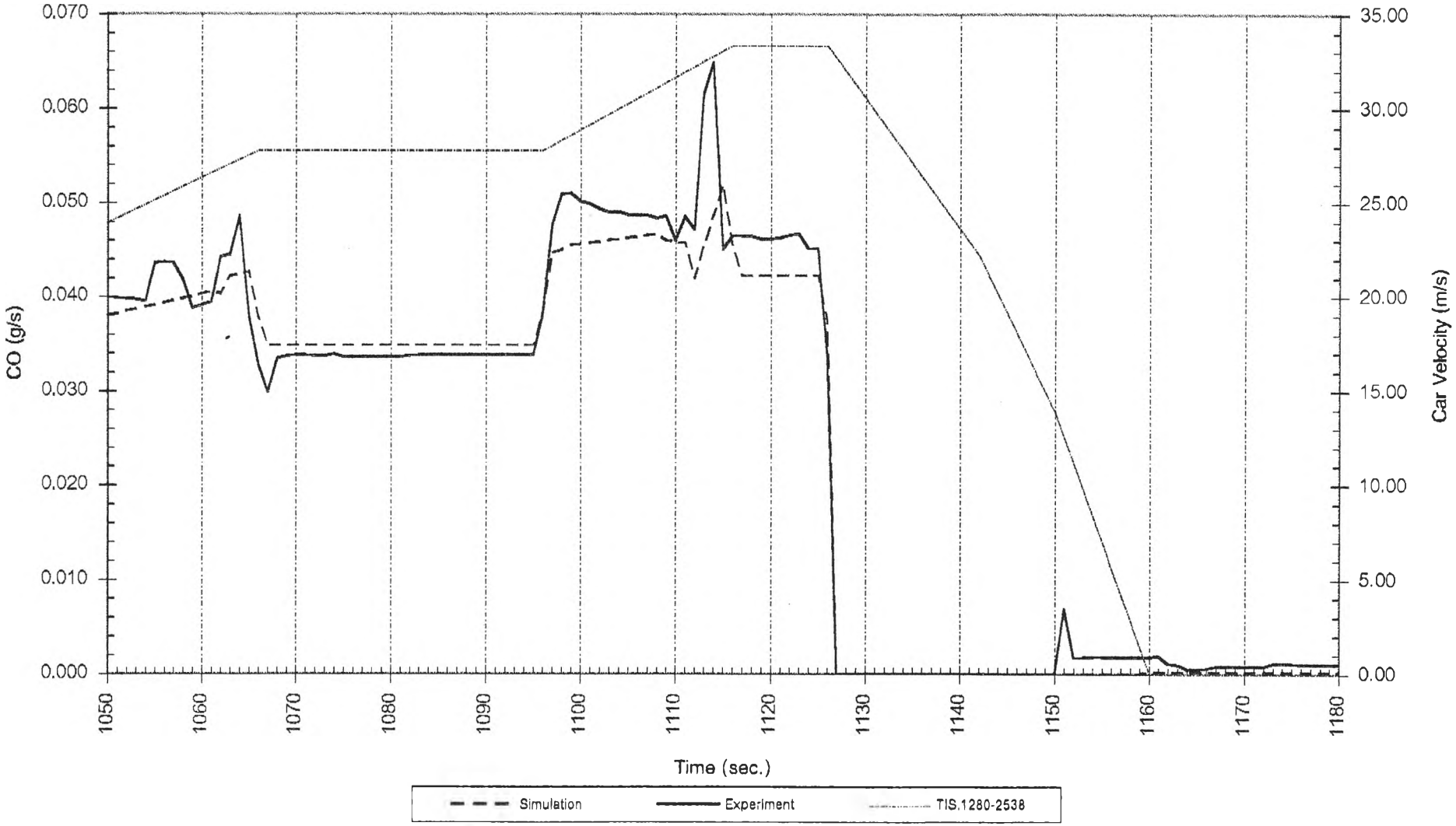
รูปที่ ซ5 (ต่อ) Compare CO from Experiment and Simulation (750-900 s.)



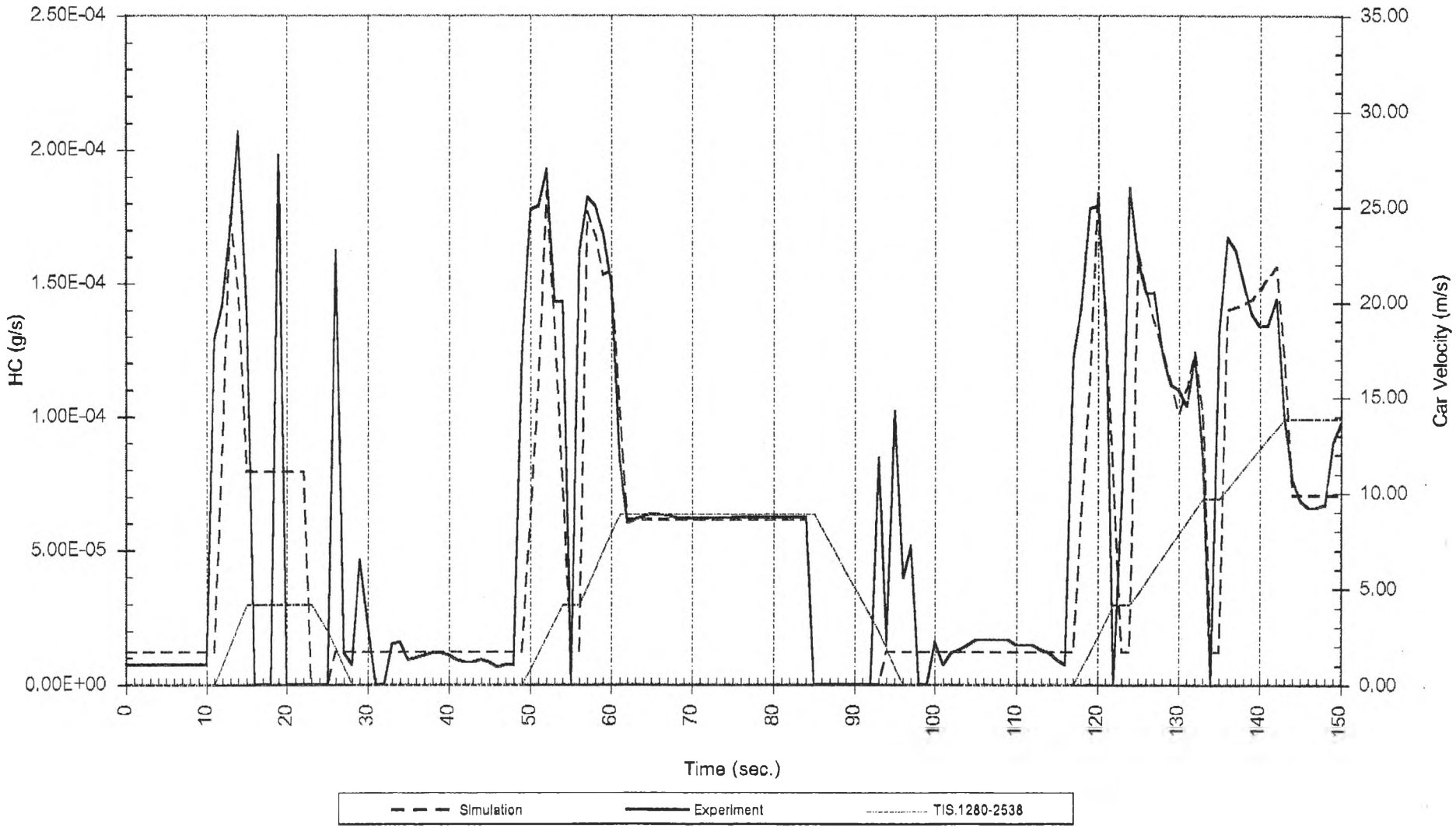
รูปที่ ซ5 (ต่อ) Compare CO from Experiment and Simulation (900-1050 s.)



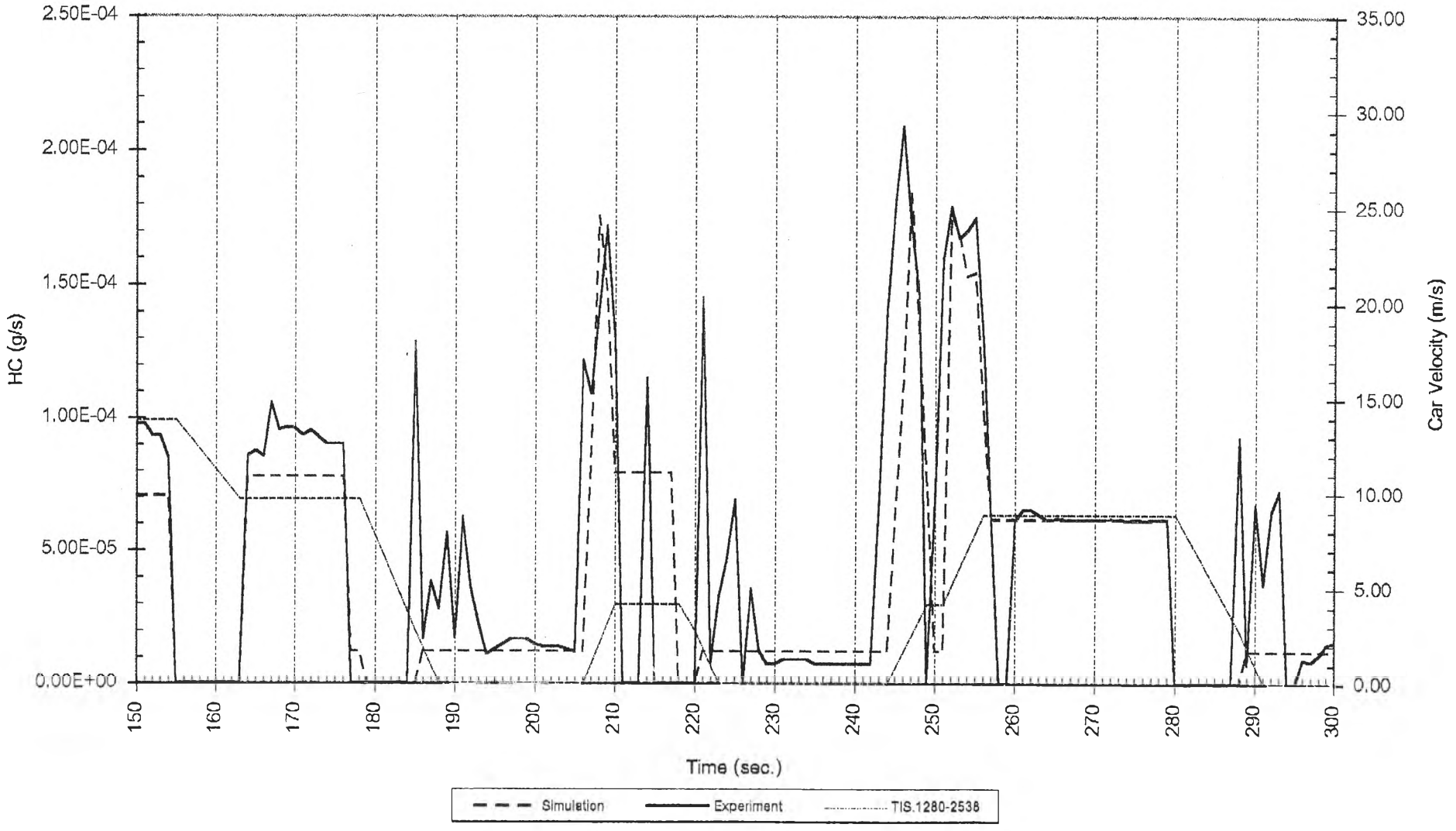
รูปที่ ซ5 (ต่อ) Compare CO from Experiment and Simulation (1050-1180 s.)



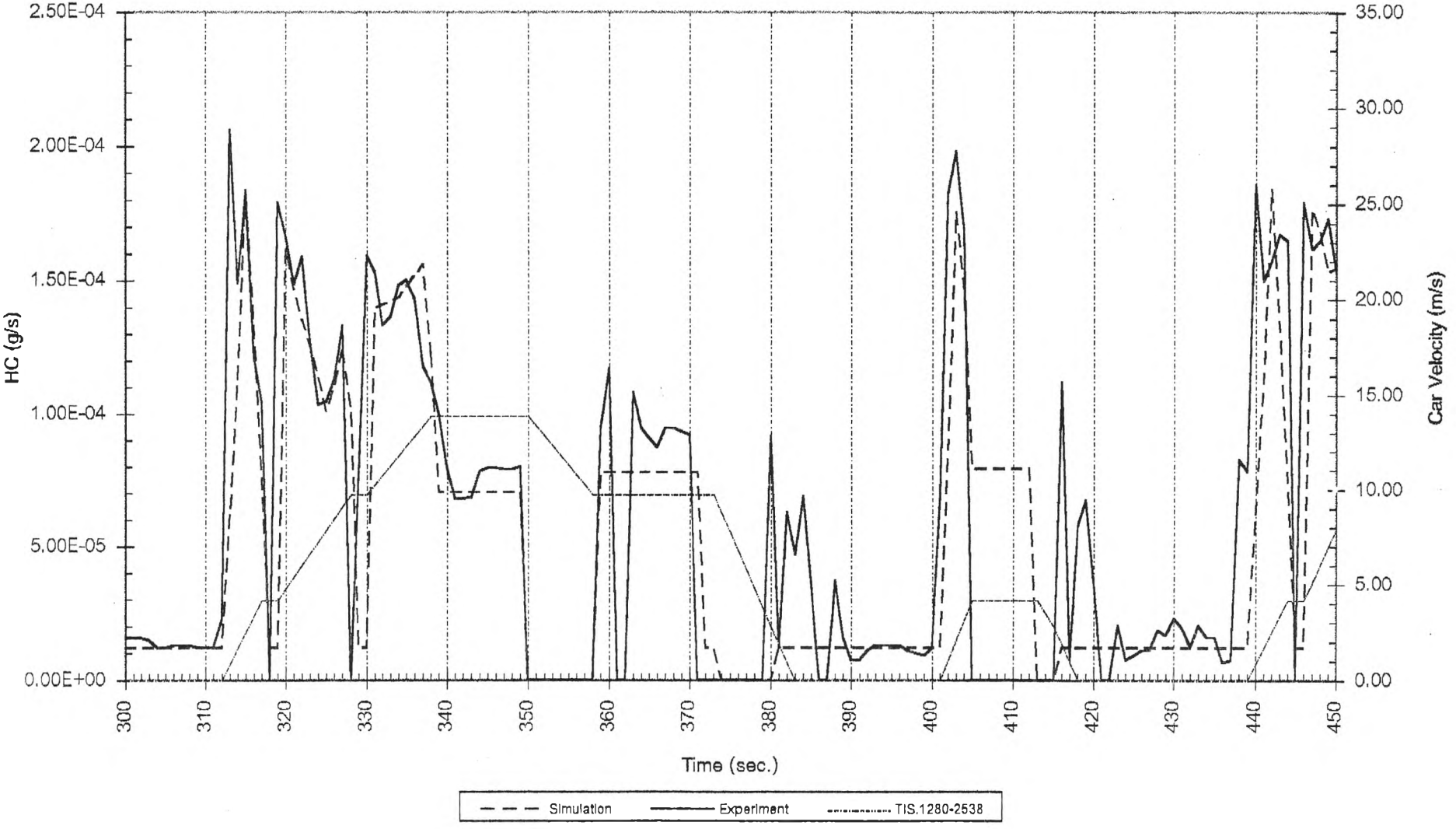
รูปที่ ซ6 Compare HC from Experiment and Simulation (0-150 s.)



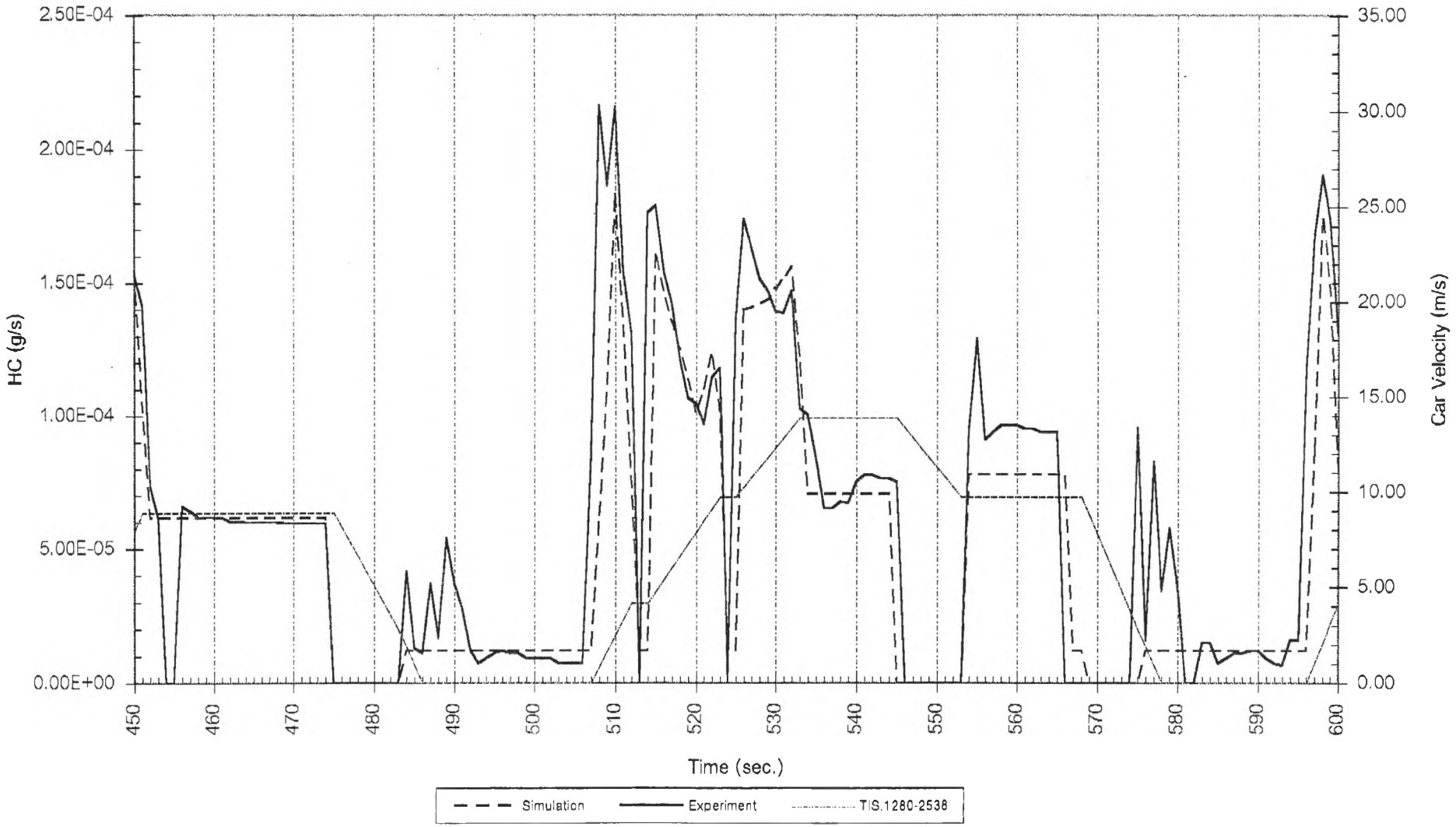
รูปที่ ซ6 (ต่อ) Compare HC from Experiment and Simulation (150-300 s.)



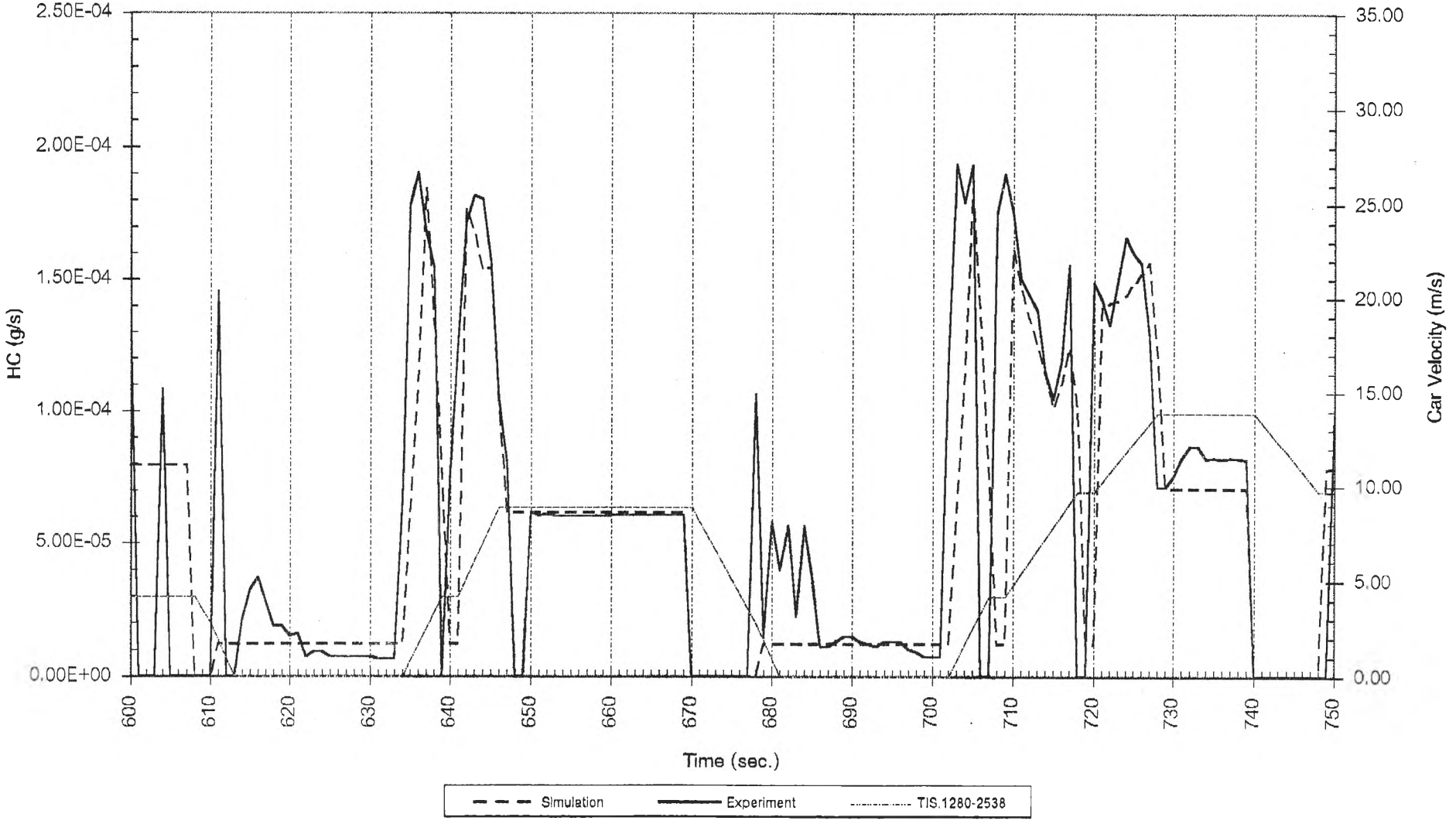
รูปที่ ซ6 (ต่อ) Compare HC from Experiment and Simulation (300-450 s.)



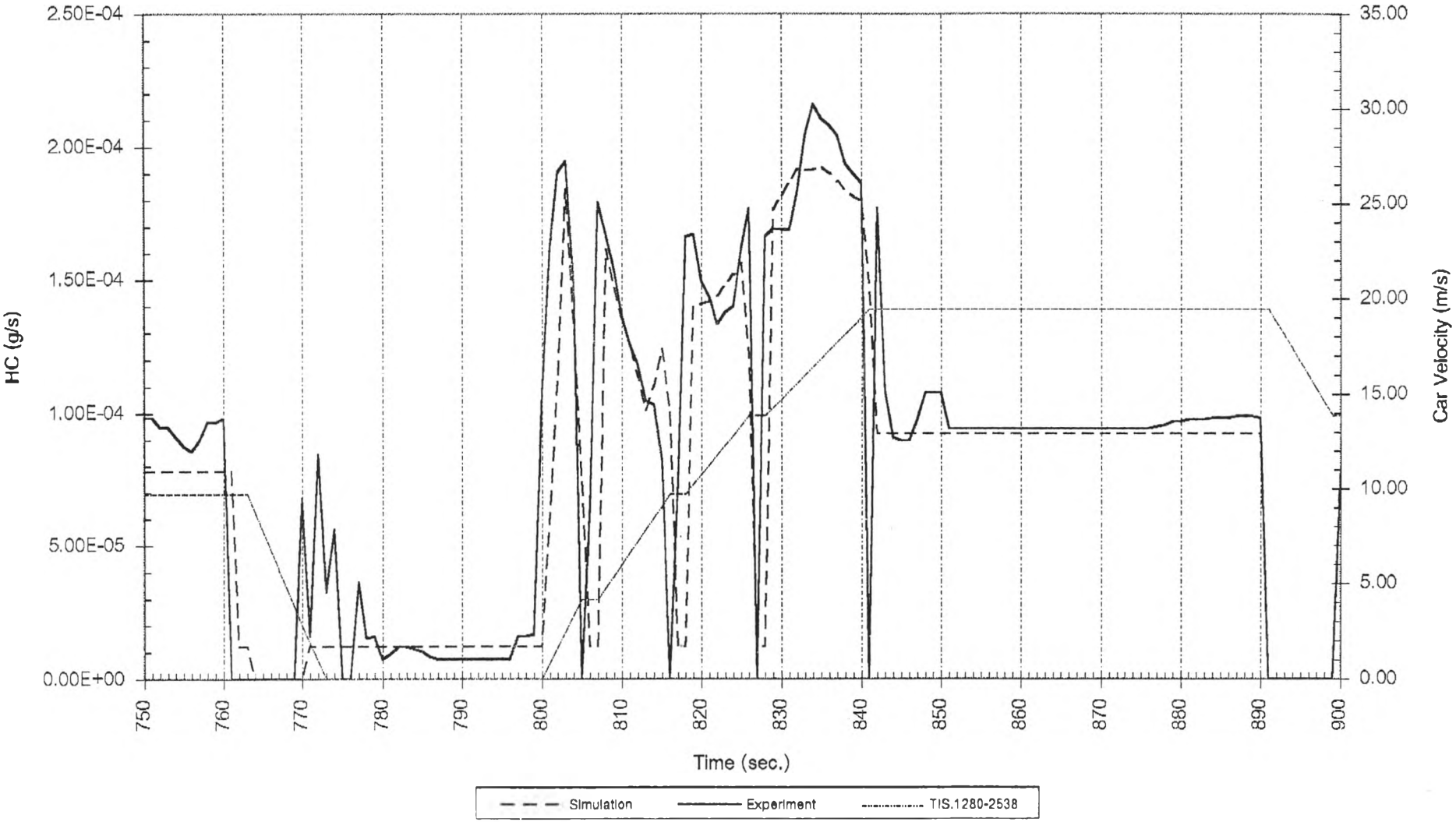
รูปที่ ซ6 (ต่อ) Compare HC from Experiment and Simulation (450-600 s.)



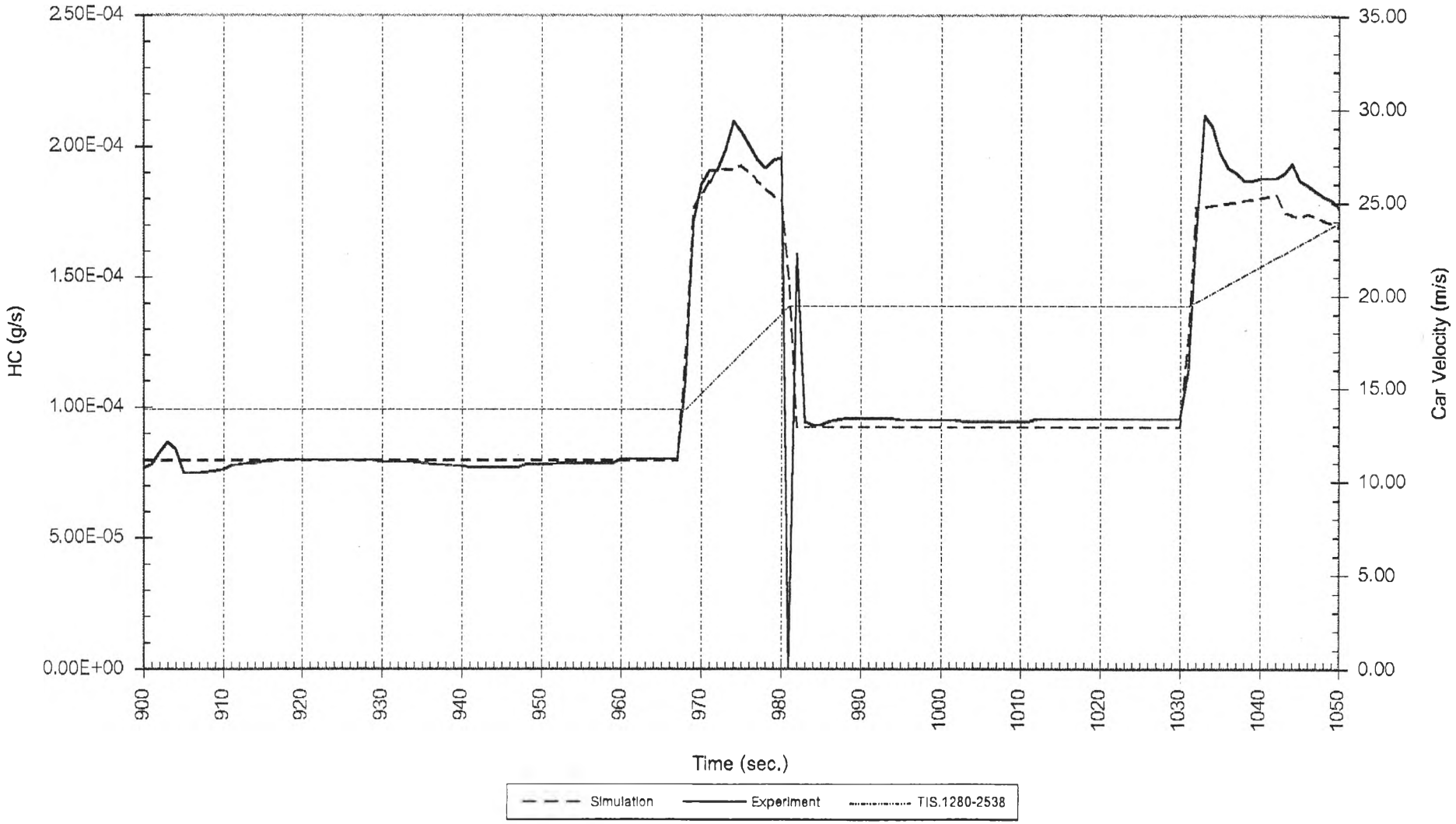
รูปที่ ซ6 (ต่อ) Compare HC from Experiment and Simulation (600-750 s.)



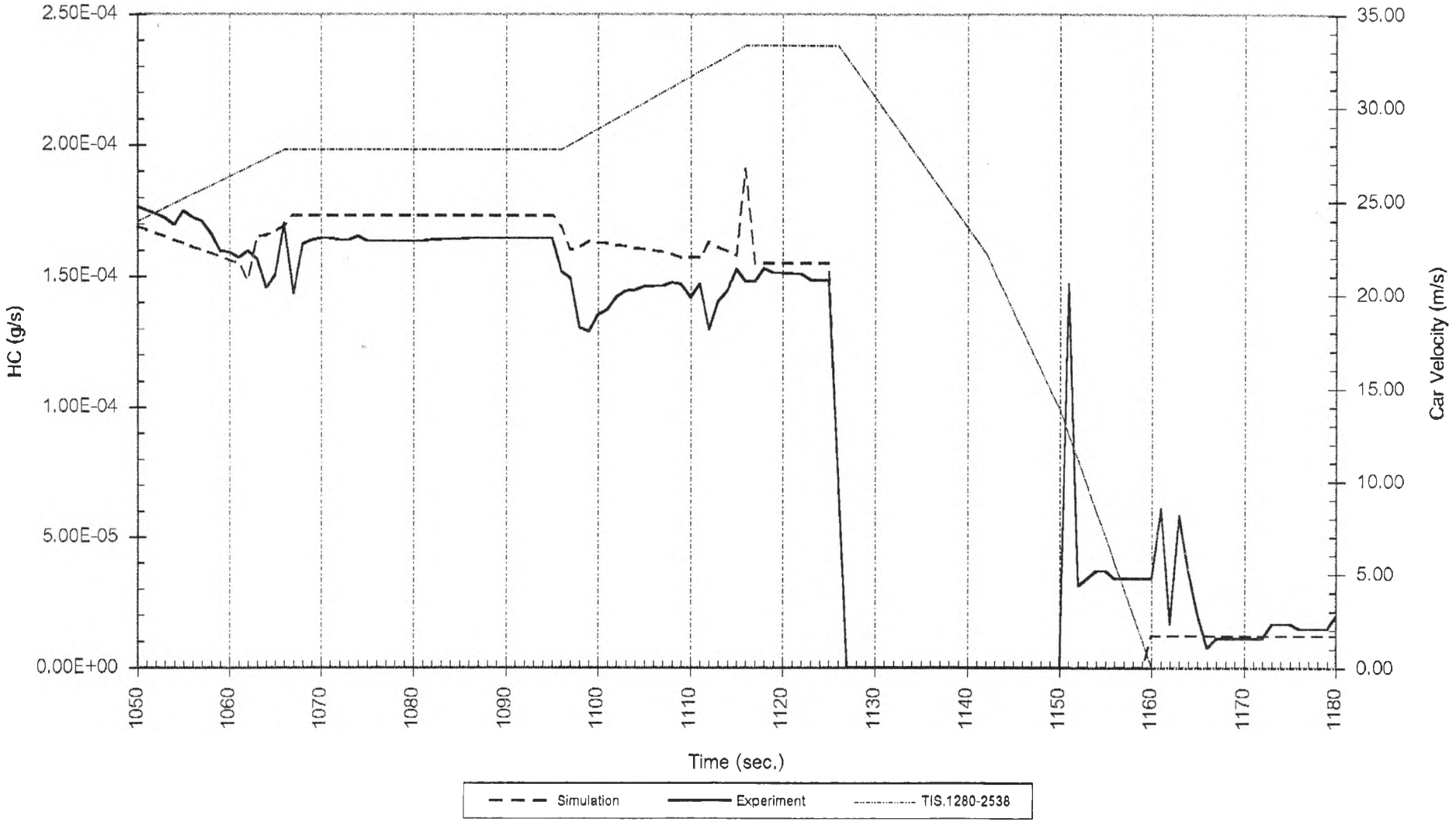
รูปที่ ซ6 (ต่อ) Compare HC from Experiment and Simulation (750-900 s.)



รูปที่ ซ6 (ต่อ) Compare HC from Experiment and Simulation (900-1050 s.)



รูปที่ ซ6 (ต่อ) Compare HC from Experiment and Simulation (1050-1180 s.)



ภาคผนวก ฌ

แสดงค่าคลาดเคลื่อนจากการเปรียบเทียบค่าจาก V.F.C.E. Model
กับค่าที่วัดได้หรือค่าที่ได้จากแบบจำลองที่ถูกดัดแปลง

ตารางที่ ฌ1 แสดงค่าคลาดเคลื่อนของความเร็วรอบเครื่องยนต์จากการคำนวณของ V.F.C.E. Model กับค่าที่วัดได้จากการทดสอบรถยนต์จริง ในแต่ละช่วงการขับขี่ ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Engine Speed			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
1	1 idle	3.73	-7.14	0.00	-2.34	-23.64
2	2 inc0-15 kph	1.36	42.31	-51.58	-6.55	-24.04
3	3 const15 kph	2.71	1.66	-8.94	-3.18	-23.36
4	4 dec15-10 kph	0.68	19.14	5.26	12.44	22.82
5	5 dec10-0 kph	1.02	31.82	-7.14	8.33	22.92
6	6 idle	7.12	16.67	-7.14	-0.23	-4.44
7	7 inc0-15 kph	1.69	44.44	-36.44	3.08	14.10
8	8 chng	0.68	62.50	42.31	54.75	100.41
9	9 inc15-32 kph	1.69	-44.56	-6.97	-17.40	-79.77
10	10 const32 kph	8.14	-6.09	-1.04	-2.69	-59.24
11	11 dec32-10 kph	2.71	28.57	2.10	10.34	75.85
12	12 dec10-0 kph	1.02	18.48	-20.97	1.62	4.44
13	13 idle	7.12	16.67	-7.14	-0.85	-16.41
14	14 inc0-15 kph	1.69	46.43	-15.38	9.50	43.58
15	15 chng	0.68	62.50	28.57	46.11	84.58
16	16 inc15-35 kph	3.05	7.17	-10.99	-4.05	-33.43
17	17 chng	0.68	72.22	50.00	63.36	116.21
18	18 inc35-50 kph	2.71	1.43	-8.85	-3.59	-26.33
19	19 const50 kph	4.07	-5.42	-1.17	-3.44	-37.82
20	20 dec50-35 kph	2.71	3.30	-5.11	-0.17	-1.22
21	21 const35 kph	4.41	0.21	-4.54	-1.38	-16.44
22	22 chng	0.68	57.14	21.05	44.46	81.55
23	23.1 transeint	0.17	-186.53	-52.82	-119.67	-54.87
	23.2 dec35-10 kph	2.20	21.05	-9.15	3.88	23.13
24	24 dec10-0 kph	1.02	16.67	-17.19	2.45	6.73
25	25 idle	2.37	16.67	-5.63	4.16	26.73
26	26 idle	1.69	6.25	-7.14	-2.12	-9.73
27	27.1 transeint	0.17	39.52	33.04	36.28	16.63
	27.2 inc0-15 kph	0.25	-3.96	-3.94	-3.95	-2.72
28	28 chng	0.17	63.41	37.50	50.46	23.14
29	29 inc15-35 kph	0.76	2.20	-2.49	0.03	0.07
30	30 chng	0.17	60.53	33.04	46.78	21.45
31	31 inc35-50 kph	0.68	-5.74	-1.22	-3.19	-5.84
32	32 chng	0.17	71.15	58.33	64.74	29.69

ตารางที่ ฌ1 (ต่อ) แสดงค่าคลาดเคลื่อนของความเร็วรอบเครื่องยนต์จากการคำนวณของ V.F.C.E. Model กับค่าที่วัดได้จากการทดสอบรถยนต์จริง ในแต่ละช่วงการขับขี่ ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Engine Speed			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
33	33.1 inc50-70 kph	1.02	-4.70	-1.39	-3.26	-8.97
	33.2 transeint	0.08	3.77	3.77	3.77	0.86
34	34 const 70 kph	4.24	-2.12	-1.64	-1.66	-19.07
35	35.1 dec 70-50 kph	0.34	2.44	-0.35	1.13	1.03
	35.2 transeint	0.17	-113.43	-36.11	-74.77	-34.28
	35.3 dec70-50 kph	0.17	2.56	2.32	2.44	1.12
36	36 const 50 kph	5.85	-3.11	-0.32	-2.76	-43.73
37	37 inc 50-70 kph	1.10	-6.50	-1.89	-3.96	-11.79
38	38.1 transeint	0.08	19.06	19.06	19.06	4.37
	38.2 const 50 kph	4.15	-2.12	-1.64	-1.93	-21.63
39	39 inc 70-100 kph	2.97	-2.99	-1.82	-2.38	-19.08
40	40 const 100 kph	2.54	-2.70	-2.03	-2.42	-16.63
41	41 inc 100-120kph	1.69	-3.05	-1.23	-1.85	-8.49
42	42 const120 kph	0.85	-1.80	-0.71	-1.14	-2.62
43	43 dec 120-80kph	1.36	1.39	-2.44	-0.96	-3.52
44	44 dec 80-50kph	0.68	4.39	0.81	2.76	5.07
45	45.1 transeint	0.08	46.43	46.43	46.43	10.64
	45.2 dec 50-0kph	0.76	-10.29	-7.14	-9.59	-19.80
46	46 idle	1.69	11.76	-10.29	-1.79	-8.21
		100.00				100.00

ตารางที่ ฌ2 แสดงค่าคลาดเคลื่อนของความดันสัมบูรณ์ท่อร่วมไอดีของเครื่องยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่วัดได้จากการทดสอบรถยนต์จริง ในแต่ละช่วงการขับขี่ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Manifold Pressure			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
1	1.1 idle	3.39	10.729	4.523	7.397	6.83
	1.2 transeint	0.34	37.719	26.627	33.332	3.08
2	2.1 transeint	0.34	42.251	21.221	31.451	2.91
	2.2 inc0-15 kph	1.02	15.713	-23.243	-0.830	-0.23
3	3.1 const15 kph	2.46	1.646	-31.489	-13.461	-9.02
	3.2 transeint	0.25	-63.916	-60.840	-62.891	-4.36
4	4 dec15-10 kph	0.68	-67.931	-9.137	-39.561	-7.31
5	5 dec10-0 kph	1.02	17.022	1.084	7.309	2.03
6	6.1 idle	6.78	26.627	-0.117	6.241	11.53
	6.2 transeint	0.34	42.096	24.957	32.199	2.97
7	7.1 inc0-15 kph	1.53	38.933	-12.687	15.363	6.39
	7.2 transeint	0.17	-77.301	-69.565	-36.717	-1.70
8	8 chng	0.68	49.231	-43.796	12.720	2.35
9	9 inc15-32 kph	1.69	21.166	-19.478	2.927	1.35
10	10.1 const32 kph	7.88	21.285	-15.853	0.010	0.02
	10.2 transeint	0.25	-61.940	-35.948	-36.424	-2.52
11	11 dec32-10 kph	2.71	23.917	-87.388	-44.241	-32.70
12	12 dec10-0 kph	1.02	10.729	2.834	7.831	2.17
13	13.1 idle	6.78	20.235	-0.117	7.820	14.45
	13.2 transeint	0.34	35.273	15.316	28.522	2.63
14	14.1 inc0-15 kph	1.44	35.824	-16.476	9.629	3.78
	14.2 transeint	0.25	-75.698	-58.361	-68.878	-4.77
15	15 chng	0.68	47.948	-57.543	13.349	2.47
16	16.1 inc15-35 kph	2.88	20.234	-22.197	1.432	1.12
	16.2 transeint	0.17	-111.900	-36.518	-74.209	-3.43
17	17 chng	0.68	44.995	-74.195	-1.166	-0.22
18	18 inc35-50 kph	2.71	16.041	-27.143	0.813	0.60
19	19 const50 kph	4.07	16.417	-26.938	3.260	3.61
20	20 dec50-35 kph	2.71	-80.466	-19.819	-55.989	-41.38
21	21.1 const35 kph	4.24	27.182	-23.925	-1.273	-1.47
	21.2 transeint	0.17	-69.150	-61.771	-65.460	-3.02
22	22 chng	0.68	-70.589	-0.117	-38.478	-7.11
23	23 dec35-10 kph	2.37	20.235	-81.171	-39.251	-25.38

ตารางที่ ฌ2 (ต่อ) แสดงค่าคลาดเคลื่อนของความดันสัมบูรณ์ท่อร่วมไอดีของเครื่องยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่วัดได้จากการทดสอบรถยนต์จริง ในแต่ละช่วงการขับขี่ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Manifold Pressure			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
24	24 dec10-0 kph	1.02	10.729	4.523	7.260	2.01
25	25.1 transeint	0.34	21.000	17.022	18.224	1.68
	25.2 idle	2.03	8.752	-0.117	3.688	2.04
26	26.1 idle	1.53	8.244	4.523	6.082	2.53
	26.2 transeint	0.17	27.911	10.729	19.320	0.89
27	27.1 inc0-15 kph	0.34	27.172	-2.872	11.278	1.04
	27.2 transeint	0.08	-85.775	-85.775	-85.775	-1.98
28	28 chng	0.17	46.771	19.455	33.113	1.53
29	29.1 inc15-35 kph	0.59	7.173	-2.155	1.809	0.29
	29.2 transeint	0.17	-114.049	-26.682	-70.366	-3.25
30	30 chng	0.17	51.041	19.455	35.248	1.63
31	31.1 transeint	0.08	14.748	14.748	14.748	0.34
	31.2 inc35-50 kph	0.51	6.591	-1.449	1.814	0.25
	31.3 transeint	0.08	26.126	26.126	26.126	0.60
32	32 chng	0.17	50.001	-65.451	-7.725	-0.36
33	33.1 inc50-70 kph	1.02	9.879	-2.549	4.423	1.23
	33.2 transeint	0.08	-178.629	-178.629	-178.629	-4.13
34	34.1 transeint	0.17	25.280	10.587	17.934	0.83
	34.2 const 70 kph	3.98	9.931	0.030	4.378	4.75
	34.3 transeint	0.08	-37.392	-37.392	-37.392	-0.86
35	35 dec70-50 kph	0.68	-81.242	-11.121	-67.585	-12.49
36	36.1 transeint	0.08	-18.094	-18.094	-18.094	-0.42
	36.2 const 50 kph	5.76	-3.823	-0.779	-1.845	-2.90
37	37.1 inc 50-70 kph	1.02	7.635	1.156	4.683	1.30
	37.2 transeint	0.08	-153.208	-153.208	-153.208	-3.54
38	38.1 transeint	0.08	17.219	17.219	17.219	0.40
	38.2 const 50 kph	4.07	5.055	3.564	4.462	4.95
	38.3 transeint	0.08	-2.620	-2.620	-2.620	-0.06
39	39.1 inc 70-100 kph	2.80	13.831	-0.758	6.078	4.63
	39.2 transeint	0.17	-9.766	-0.617	-5.191	-0.24
40	40.1 transeint	0.08	-8.717	-8.717	-8.717	-0.20
	40.2 const 100 kph	2.46	9.721	7.303	8.282	5.55
41	41 inc 100-120kph	1.69	13.237	0.102	7.577	3.50
42	42.1 const120 kph	0.76	14.264	9.644	11.952	2.48
	42.2 transeint	0.08	-11.336	-11.336	-11.336	-0.26
43	43 dec 120-80kph	1.36	-125.742	-74.701	-91.596	-33.85
44	44 dec 80-50kph	0.68	-88.453	-52.871	-76.035	-14.05
45	45 dec 50-0kph	0.85	19.455	15.316	18.404	4.25
46	46 idle	1.69	24.613	3.404	9.037	4.17
		100.00				-100.00

ตารางที่ ฌ3 แสดงค่าคลาดเคลื่อนของการสิ้นเปลืองเชื้อเพลิงของเครื่องยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่วัดได้จากแบบจำลองที่ถูกดัดแปลง ในแต่ละช่วงการขับขี่ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Fuel Consumption			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
1	1.1 idle	3.39	18.575	9.966	13.733	219.66
	1.2 transeint	0.34	50.809	38.415	45.954	73.50
2	2 inc0-15 kph	1.36	61.797	-100.000	-3.286	-21.02
3	3 const15 kph	2.71	0.000	-116.349	-82.166	-1051.39
4	4 dec15-10 kph	0.68	0.000	0.000	0.000	0.00
5	5.1 dec10-0 kph	0.85	48.178	10.807	27.219	108.84
	5.2 transeint	0.17	-100.000	-100.000	-100.000	-79.97
6	6 idle	7.12	54.739	-100.000	8.995	302.13
7	7.1 inc0-15 kph	1.53	72.468	-22.225	19.917	143.36
	7.2 transeint	0.17	-100.000	-100.000	-100.000	-79.97
8	8.1 transeint	0.17	-100.000	-100.000	-100.000	-79.97
	8.2 chng	0.51	79.913	62.706	73.380	176.06
9	9 inc15-32 kph	1.69	12.169	-48.955	-16.717	-133.69
10	10.1 transeint	0.51	-100.000	-100.000	-100.000	-239.92
	10.2 const32 kph	7.63	16.651	-19.899	-2.640	-95.02
11	11.1 dec32-10 kph	2.46	0.000	0.000	0.000	0.00
	11.2 transeint	0.25	100.000	100.000	100.000	119.96
12	12 dec10-0 kph	1.02	37.698	10.329	21.000	100.77
13	13.1 transeint	0.34	-100.000	-100.000	-100.000	-159.95
	13.2 idle	6.78	48.158	10.807	17.240	551.52
14	14.1 inc0-15 kph	1.44	62.526	-44.512	23.968	162.93
	14.2 transeint	0.25	-100.000	-100.000	-100.000	-119.96
15	15.1 transeint	0.17	-100.000	-100.000	-100.000	-79.97
	15.2 chng	0.51	78.845	59.717	71.154	170.72
16	16.1 inc15-35 kph	2.88	17.091	-31.817	-5.085	-69.14
	16.2 transeint	0.17	-100.000	-100.000	-100.000	-79.97
17	17.1 transeint	0.25	-100.000	-100.000	-100.000	-119.96
	17.2 chng	0.42	88.914	79.718	82.903	165.75
18	18.1 inc35-50 kph	2.63	8.553	-22.775	-3.716	-46.06
	18.2 transeint	0.08	-46.918	-46.918	-46.918	-18.76
19	19 const50 kph	4.07	17.351	-34.213	0.403	7.74
20	20 dec50-35 kph	2.71	0.000	0.000	0.000	0.00
21	21 const35 kph	4.41	33.665	-100.000	-13.982	-290.73
22	22 chng	0.68	-100.000	-100.000	-100.000	-319.90

ตารางที่ ฌ3 (ต่อ) แสดงค่าคลาดเคลื่อนของการสิ้นเปลืองเชื้อเพลิงของเครื่องยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่วัดได้จากแบบจำลองที่ถูกดัดแปลง ในแต่ละช่วงการขับขี่ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Fuel Consumption			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
23	23.1 dec35-10 kph	2.03	0.000	0.000	0.000	0.00
	23.2 transeint	0.34	100.000	100.000	100.000	159.95
24	24 dec10-0 kph	1.02	32.201	12.671	21.496	103.15
25	25 idle	2.37	34.780	-100.000	-7.155	-80.11
26	26.1 idle	1.61	18.575	10.807	12.284	93.33
	26.2 transeint	0.08	44.338	44.338	44.338	17.73
27	27.1 inc0-15 kph	0.34	64.796	-7.725	26.748	42.78
	27.2 transeint	0.08	-100.000	-100.000	-100.000	-39.99
28	28 chng	0.17	75.611	74.659	75.135	60.09
29	29.1 inc15-35 kph	0.68	3.022	-34.771	-4.908	-15.70
	29.2 transeint	0.08	-100.000	-100.000	-100.000	-39.99
30	30 chng	0.17	75.522	74.582	75.052	60.02
31	31.1 inc35-50 kph	0.59	4.707	-5.543	-1.041	-2.91
	31.2 transeint	0.08	26.492	26.492	26.492	10.59
32	32 chng	0.17	85.159	-100.000	-7.420	-5.93
33	33.1 inc50-70 kph	1.02	8.905	-8.154	1.147	5.50
	33.2 transeint	0.08	-100.000	-100.000	-100.000	-39.99
34	34.1 transeint	0.08	27.675	27.675	27.675	11.07
	34.1 const 70 kph	4.15	9.572	-2.059	2.845	55.74
35	35 dec70-50 kph	0.68	0.000	0.000	0.000	0.00
36	36.1 transeint	0.08	-33.038	-33.038	-33.038	-13.21
	36.2 const 50 kph	5.76	5.152	-12.506	-5.011	-136.24
37	37.1 inc 50-70 kph	1.02	5.011	-4.450	0.728	3.49
	37.2 transeint	0.08	-100.000	-100.000	-100.000	-39.99
38	38.1 transeint	0.08	37.573	37.573	37.573	15.02
	38.2 const 50 kph	4.07	3.001	0.920	2.458	47.18
	38.3 transeint	0.08	-5.596	-5.596	-5.596	-2.24
39	39.1 inc 70-100 kph	2.88	11.111	-9.202	2.629	35.74
	39.2 transeint	0.08	-22.683	-22.683	-22.683	-9.07
40	40.1 transeint	0.08	-23.602	-23.602	-23.602	-9.44
	40.2 const 100 kph	2.46	2.832	-0.385	1.077	12.49
41	41 inc 100-120kph	1.69	10.770	-3.570	5.504	44.02
42	42.1 const120 kph	0.76	13.149	7.937	10.597	38.14
	42.2 transeint	0.08	-24.466	-24.466	-24.466	-9.78
43	43 dec 120-80kph	1.36	0.000	0.000	0.000	0.00
44	44 dec 80-50kph	0.68	0.000	0.000	0.000	0.00
45	45.1 transeint	0.76	100.000	100.000	100.000	359.89
	45.2 dec 50-0kph	0.08	28.080	28.080	28.080	11.23
46	46.1 transeint	0.08	35.783	35.783	35.783	14.31
	46.2 idle	1.61	24.845	10.807	16.524	125.54
		100.00				100.00

ตารางที่ ฌ4 แสดงค่าคลาดเคลื่อนของการเกิดคาร์บอนไดออกไซด์ของเครื่องยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่ประมาณได้จากแบบจำลองที่ถูกดัดแปลง ในแต่ละช่วงการขับขี่ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Carbondioxide			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
1	1 idle	3.73	18.778	-15.662	-1.432	1.98
2	2.1 inc0-15 kph	1.27	73.870	-30.289	11.106	-5.23
	2.2 transeint	0.08	-100.000	-100.000	-100.000	3.14
3	3.1 transeint	2.12	-100.000	-100.000	-100.000	78.45
	3.2 const15 kph	0.59	5.410	-20.949	-1.458	0.32
4	4 dec15-10 kph	0.68	0.000	0.000	0.000	0.00
5	5.1 dec10-0 kph	0.85	54.639	-6.776	20.605	-6.47
	5.2 transeint	0.17	-100.000	-100.000	-100.000	6.28
6	6.1 transeint	0.42	-100.000	-100.000	-100.000	15.69
	6 idle	6.69	36.323	-17.035	-0.137	0.34
7	7.1 inc0-15 kph	1.53	77.869	-33.372	25.074	-14.16
	7.2 transeint	0.17	-100.000	-100.000	-100.000	6.28
8	8.1 transeint	0.17	-100.000	-100.000	-100.000	6.28
	8.2 chng	0.51	80.402	62.320	73.182	-13.78
9	9 inc15-32 kph	1.69	12.265	-57.517	-18.029	11.32
10	10.1 transeint	0.51	-100.000	-100.000	-100.000	18.83
	10.2 const32 kph	7.63	19.743	-31.763	-2.522	7.12
11	11.1 dec32-10 kph	2.46	0.000	0.000	0.000	0.00
	11.2 transeint	0.25	100.000	100.000	100.000	-9.41
12	12 dec10-0 kph	1.02	39.226	-6.776	12.903	-4.86
13	13.1 transeint	0.34	-100.000	-100.000	-100.000	12.55
	13.2 idle	6.78	28.504	-15.347	0.786	-1.97
14	14.1 inc0-15 kph	1.44	74.025	-5.985	31.875	-17.00
	14.2 transeint	0.25	-100.000	-100.000	-100.000	9.41
15	15.1 transeint	0.17	-100.000	-100.000	-100.000	6.28
	15.2 chng	0.51	79.180	59.896	70.721	-13.32
16	16.1 inc15-35 kph	2.88	19.216	-40.360	-12.735	13.59
	16.2 transeint	0.17	-100.000	-100.000	-100.000	6.28
17	17.1 transeint	0.25	-100.000	-100.000	-100.000	9.41
	17.2 chng	0.42	90.455	79.814	83.840	-13.15
18	18.1 inc35-50 kph	2.54	13.631	-21.546	-2.177	2.05
	18.2 transeint	0.17	-61.055	-31.227	-46.141	2.90
19	19.1 transeint	0.08	-51.044	-51.044	-51.044	1.60
	19.2 const50 kph	3.90	20.681	-26.691	0.997	-1.44
	19.3 transeint	0.08	100.000	100.000	100.000	-3.14
20	20 dec50-35 kph	2.71	0.000	0.000	0.000	0.00
21	21.1 const35 kph	3.90	44.141	4.737	19.408	-28.02
	21.2 transeint	0.51	-100.000	-100.000	-100.000	18.83
22	22 chng	0.68	-100.000	-100.000	-100.000	25.10

ตารางที่ ฌ4 (ต่อ) แสดงค่าคลาดเคลื่อนของการเกิดคาร์บอนไดออกไซด์ของเครื่องยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่ประมาณได้จากแบบจำลองที่ถูกดัดแปลง ในแต่ละช่วงการขับขี่ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Carbondioxide			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
23	23.1 dec35-10 kph	2.03	0.000	0.000	0.000	0.00
	23.2 transeint	0.34	100.000	100.000	100.000	-12.55
24	24 dec10-0 kph	1.02	32.917	-1.121	14.658	-5.52
25	25.1 transeint	0.51	-100.000	-100.000	-100.000	18.83
	25.2 idle	1.86	24.452	-8.692	6.796	-4.69
26	26.1 idle	1.61	8.008	-6.776	-3.453	2.06
	26.2 transeint	0.08	17.401	17.401	17.401	-0.55
27	27.1 transeint	0.17	67.661	62.679	65.170	-4.09
	27.2 inc0-15 kph	0.17	4.522	-2.493	1.014	-0.06
	27.3 transeint	0.08	-100.000	-100.000	-100.000	3.14
28	28 chng	0.17	76.064	73.272	74.668	-4.69
29	29.1 inc15-35 kph	0.68	-39.448	-2.357	-11.942	3.00
	29.2 transeint	0.08	-100.000	-100.000	-100.000	3.14
30	30 chng	0.17	75.006	74.356	74.681	-4.69
31	31.1 inc35-50 kph	0.59	11.934	-9.801	-0.564	0.12
	31.2 transeint	0.08	26.328	26.328	26.328	-0.83
32	32 chng	0.17	86.868	-100.000	-6.566	0.41
33	33.1 inc50-70 kph	1.02	12.020	-4.602	3.617	-1.36
	33.2 transeint	0.08	-100.000	-100.000	-100.000	3.14
34	34.1 transeint	0.08	29.624	29.624	29.624	-0.93
	34.2 const 70 kph	4.15	3.255	-7.993	-3.229	4.97
35	35 dec70-50 kph	0.68	0.000	0.000	0.000	0.00
36	36.1 const 50 kph	5.68	11.765	-1.365	3.347	-7.04
	36.2 transeint	0.17	-25.806	-21.767	-23.787	1.49
37	37.1 inc 50-70 kph	1.02	8.860	-2.786	3.014	-1.13
	37.2 transeint	0.08	-100.000	-100.000	-100.000	3.14
38	38.1 transeint	0.08	45.745	45.745	45.745	-1.44
	38.2 const 50 kph	4.15	-9.457	-3.571	-4.432	6.81
39	39 inc 70-100 kph	2.97	16.125	-25.654	1.270	-1.40
40	40.1 transeint	0.08	-27.733	-27.733	-27.733	0.87
	40.2 const 100 kph	2.46	2.879	-0.440	1.050	-0.96
41	41 inc 100-120kph	1.69	6.907	-7.049	0.689	-0.43
42	42.1 const120 kph	0.76	11.668	7.152	9.612	-2.71
	42.2 transeint	0.08	-30.430	-30.430	-30.430	0.95
43	43 dec 120-80kph	1.36	0.000	0.000	0.000	0.00
44	44 dec 80-50kph	0.68	0.000	0.000	0.000	0.00
45	45.1 dec 50-0kph	0.76	100.000	100.000	100.000	-28.24
	45.2 transeint	0.08	-9.648	-9.648	-9.648	0.30
46	46 idle	1.69	23.207	-19.813	1.806	-1.13
		100.00				100.00

ตารางที่ ฌ5 แสดงค่าคลาดเคลื่อนของการเกิดคาร์บอนมอนนอกไซด์ของรถยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่ประมาณได้จากแบบจำลองที่ถูกดัดแปลง ในแต่ละช่วงการขับขี่ ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Carbonmonoxide			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
1	1 idle	3.73	90.849	53.733	75.446	19.15
2	2.1 transeint	0.25	-651.501	-197.435	-382.216	-6.62
	2 inc0-15 kph	1.10	91.852	-100.000	-17.569	-1.32
3	3.1 transeint	2.12	-100.000	-100.000	-100.000	-14.42
	3.2 const15 kph	0.59	12.273	-3.323	1.059	0.04
4	4 dec15-10 kph	0.68	0.000	0.000	0.000	0.00
5	5.1 dec10-0 kph	0.85	95.250	68.162	81.681	4.71
	5.2 transeint	0.17	-100.000	-100.000	-100.000	-1.15
6	6.1 transeint	0.42	-100.000	-100.000	-100.000	-2.88
	6.2 idle	6.69	91.357	24.244	69.968	31.89
7	7.1 inc0-15 kph	1.61	97.925	-103.786	11.677	1.28
	7.2 transeint	0.08	-231.423	-231.423	-231.423	-1.34
8	8.1 transeint	0.17	-100.000	-100.000	-100.000	-1.15
	8.2 chng	0.51	99.094	97.076	98.499	3.41
9	9.1 transeint	0.25	-87.208	-68.584	-76.323	-1.32
	9.2 inc15-32 kph	1.44	12.967	-36.864	-10.419	-1.02
10	10.1 transeint	0.51	-100.000	-100.000	-100.000	-3.46
	10.2 const32 kph	7.63	17.037	-17.982	-1.632	-0.85
11	11.1 dec32-10 kph	2.46	0.000	0.000	0.000	0.00
	11.2 transeint	0.25	100.000	100.000	100.000	1.73
12	12.1 transeint	0.17	0.643	0.643	0.643	0.01
	12.2 dec10-0 kph	0.85	90.908	68.162	83.110	4.80
13	13.1 transeint	0.34	-100.000	-100.000	-100.000	-2.31
	13 idle	6.78	91.168	53.733	77.624	35.83
14	14 inc0-15 kph	1.69	95.824	-100.000	11.024	1.27
15	15.1 transeint	0.17	-100.000	-100.000	-100.000	-1.15
	15.2 chng	0.51	99.038	96.754	98.107	3.40
16	16.1 inc15-35 kph	2.88	27.487	-70.185	-10.314	-2.02
	16.2 transeint	0.17	-100.000	-100.000	-100.000	-1.15
17	17.1 transeint	0.25	-100.000	-100.000	-100.000	-1.73
	17.2 chng	0.42	99.416	99.139	99.279	2.86
18	18 inc35-50 kph	2.71	21.466	-25.419	5.106	0.94
19	19.1 const50 kph	3.98	11.037	-35.407	-4.126	-1.12
	19.2 transeint	0.08	100.000	100.000	100.000	0.58
20	20 dec50-35 kph	2.71	0.000	0.000	0.000	0.00
21	21.1 const35 kph	3.90	78.949	52.169	56.051	14.88
	21.2 transeint	0.51	-100.000	-100.000	-100.000	-3.46

ตารางที่ ฌ5 (ต่อ) แสดงค่าคลาดเคลื่อนของการเกิดคาร์บอนมอนนอกไซด์ของรถยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่ประมาณได้จากแบบจำลองที่ถูกดัดแปลง ในแต่ละช่วงการขับขี่ ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Carbonmonoxide			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
22	22 chng	0.68	-100.000	-100.000	-100.000	-4.62
23	23.1 dec35-10 kph	2.03	0.000	0.000	0.000	0.00
	23.2 transeint	0.34	100.000	100.000	100.000	2.31
24	24 dec10-0 kph	1.02	87.564	53.733	78.467	5.43
25	25.1 transeint	0.51	-100.000	-100.000	-100.000	-3.46
	25.2 idle	1.86	90.921	28.123	66.631	8.46
26	26 idle	1.69	91.694	53.733	70.878	8.18
27	27 inc0-15 kph	0.42	96.632	-100.000	0.677	0.02
28	28 chng	0.17	98.911	98.604	98.757	1.14
29	29.1 inc15-35 kph	0.68	9.010	-19.742	-1.179	-0.05
	29.2 transeint	0.08	-100.000	-100.000	-100.000	-0.58
30	30 chng	0.17	98.674	98.529	98.601	1.14
31	31 inc35-50 kph	0.68	24.937	-1.680	10.085	0.47
32	32 chng	0.17	99.381	-100.000	-0.310	0.00
33	33.1 inc50-70 kph	1.02	11.850	-18.282	0.018	0.00
	33.2 transeint	0.08	-100.000	-100.000	-100.000	-0.58
34	34.1 transeint	0.08	30.887	30.887	30.887	0.18
	34.2 const 70 kph	4.15	0.322	-14.729	-8.042	-2.27
35	35 dec70-50 kph	0.68	0.000	0.000	0.000	0.00
36	36.1 transeint	0.08	-47.701	-47.701	-47.701	-0.28
	36.2 const 50 kph	5.76	5.926	-26.119	-18.395	-7.22
37	37.1 inc 50-70 kph	1.02	12.067	-12.431	-0.506	-0.04
	37.2 transeint	0.08	-100.000	-100.000	-100.000	-0.58
38	38.1 transeint	0.08	21.064	21.064	21.064	0.12
	38.2 const 50 kph	4.07	-9.845	-8.640	-9.030	-2.50
	38.3 transeint	0.08	3.733	3.733	3.733	0.02
39	39 inc 70-100 kph	2.97	20.096	-15.201	5.161	1.04
40	40.1 transeint	0.08	-16.460	-16.460	-16.460	-0.09
	40.2 const 100 kph	2.37	-4.035	-2.594	-3.153	-0.51
	40.3 transeint	0.08	-0.289	-0.289	-0.289	0.00
41	41 inc 100-120kph	1.69	26.381	-15.120	7.164	0.83
42	42.1 const120 kph	0.76	9.507	6.297	8.312	0.43
	42.2 transeint	0.08	-10.891	-10.891	-10.891	-0.06
43	43 dec 120-80kph	1.36	0.000	0.000	0.000	0.00
44	44 dec 80-50kph	0.68	0.000	0.000	0.000	0.00
45	45 dec 50-0kph	0.85	100.000	89.495	98.950	5.71
46	46 idle	1.69	90.394	59.594	78.603	9.07
		100.00				100.00

ตารางที่ ฌ6 แสดงค่าคลาดเคลื่อนของการเกิดไฮโดรคาร์บอนของรถยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่ประมาณได้จากแบบจำลองที่ถูกดัดแปลง ในแต่ละช่วงการขับขี่ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Hydrocarbon			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
1	1 idle	3.73	90.630	-86.100	-9.042	-204.96
2	2.1 inc0-15 kph	1.27	52.241	-24.485	5.677	43.87
	2.2 transeint	0.08	-100.000	-100.000	-100.000	-51.52
3	3.1 transeint	2.12	-100.000	-100.000	-100.000	-1287.95
	3.2 const15 kph	0.59	59.995	0.000	16.815	60.64
4	4 dec15-10 kph	0.68	0.000	0.000	0.000	0.00
5	5.1 dec10-0 kph	0.85	92.566	-62.970	31.772	163.69
	5.2 transeint	0.17	-100.000	-100.000	-100.000	-103.04
6	6 idle	7.12	91.442	-100.000	-12.737	-551.19
7	7.1 inc0-15 kph	1.53	66.796	-17.112	29.776	276.12
	7.2 transeint	0.17	-100.000	-100.000	-100.000	-103.04
8	8.1 transeint	0.17	-100.000	-100.000	-100.000	-103.04
	8.2 chng	0.51	93.268	82.398	89.248	275.87
9	9 inc15-32 kph	1.69	27.491	-22.625	4.312	44.43
10	10.1 transeint	0.51	-100.000	-100.000	-100.000	-309.11
	10.2 transeint	0.17	23.562	16.078	19.820	20.42
	10.3 const32 kph	7.46	6.758	-3.394	-0.183	-8.31
11	11.1 dec32-10 kph	2.46	0.000	0.000	0.000	0.00
	11.2 transeint	0.25	100.000	100.000	100.000	154.55
12	12 dec10-0 kph	1.02	88.163	-62.970	41.442	256.20
13	13.1 transeint	0.34	-100.000	-100.000	-100.000	-206.07
	13 idle	6.78	90.115	-62.970	7.022	289.41
14	14.1 inc0-15 kph	1.44	71.460	-9.720	29.417	257.64
	14.2 transeint	0.25	-100.000	-100.000	-100.000	-154.55
15	15.1 transeint	0.17	-100.000	-100.000	-100.000	-103.04
	15.2 chng	0.51	93.658	82.329	91.512	282.87
16	16.1 inc15-35 kph	2.88	20.270	-19.651	2.087	36.56
	16.2 transeint	0.17	-100.000	-100.000	-100.000	-103.04
17	17.1 transeint	0.25	-100.000	-100.000	-100.000	-154.55
	17.2 chng	0.42	92.436	84.448	90.134	232.18
18	18.1 inc35-50 kph	2.63	19.701	-32.034	-2.052	-32.78
	18.2 transeint	0.08	-71.831	-71.831	-71.831	-37.01
19	19.1 const50 kph	3.98	29.701	-8.194	9.087	220.02
	19.2 transeint	0.08	100.000	100.000	100.000	51.52
20	20 dec50-35 kph	2.71	0.000	0.000	0.000	0.00
21	21.1 transeint	0.25	-100.000	-100.000	-100.000	-154.55
	21.2 const35 kph	3.90	39.791	8.862	17.660	418.51
	21.3 transeint	0.25	-100.000	-100.000	-100.000	-154.55

ตารางที่ ฌ6 (ต่อ) แสดงค่าคลาดเคลื่อนของการเกิดไฮโดรคาร์บอนของรถยนต์จากการประมาณค่าของ V.F.C.E. Model กับค่าที่ประมาณได้จากแบบจำลองที่ถูกดัดแปลง ในแต่ละช่วงการขับขี่ตาม มอก.1280-2538

Operation	Condition	Weight of Time	Hydrocarbon			
		(%)	MAX (%)	MIN (%)	Mean of Error (%)	Weight of Error (%)
22	22 chng	0.68	-100.000	-100.000	-100.000	-412.14
23	23.1 dec35-10 kph	2.03	0.000	0.000	0.000	0.00
	23.2 transeint	0.34	100.000	100.000	100.000	206.07
24	24.1 transeint	0.08	-0.500	-0.500	-0.500	-0.26
	24.2 dec10-0 kph	0.93	85.724	24.118	59.530	337.36
25	25 idle	2.37	82.475	-100.000	4.419	63.74
26	26.1 idle	1.61	27.322	-62.970	-34.643	-339.10
	26.2 transeint	0.08	88.780	88.780	88.780	45.74
27	27.1 inc0-15 kph	0.34	62.017	5.396	29.712	61.23
	27.2 transeint	0.08	-100.000	-100.000	-100.000	-51.52
28	28 chng	0.17	93.279	81.424	87.352	90.00
29	29.1 inc15-35 kph	0.59	4.489	-6.686	1.249	4.50
	29.2 transeint	0.17	-100.000	-51.393	-75.696	-77.99
30	30 chng	0.17	92.754	83.710	88.232	90.91
31	31.1 inc35-50 kph	0.59	16.338	-8.423	0.425	1.53
	31.2 transeint	0.08	31.034	31.034	31.034	15.99
32	32 chng	0.17	92.763	-100.000	-3.619	-3.73
33	33.1 inc50-70 kph	1.02	11.481	-10.427	2.538	15.69
	33.2 transeint	0.08	-100.000	-100.000	-100.000	-51.52
34	34.1 transeint	0.08	47.828	47.828	47.828	24.64
	34.2 const 70 kph	4.15	14.672	-2.946	3.753	94.75
35	35 dec70-50 kph	0.68	0.000	0.000	0.000	0.00
36	36 const 50 kph	5.85	8.120	-9.214	-1.405	-49.95
37	37.1 inc 50-70 kph	1.02	8.691	-3.030	4.019	24.85
	37.2 transeint	0.08	-100.000	-100.000	-100.000	-51.52
38	38.1 transeint	0.08	41.914	41.914	41.914	21.59
	38.2 const 50 kph	4.07	3.575	0.817	2.945	72.83
	38.3 transeint	0.08	-10.345	-10.345	-10.345	-5.33
	39 inc 70-100 kph	2.97	16.431	-13.795	4.019	72.47
40	40.1 transeint	0.08	-20.781	-20.781	-20.781	-10.71
	40.2 const 100 kph	2.37	-6.650	-4.716	-5.485	-79.12
	40.3 transeint	0.08	-11.184	-11.184	-11.184	-5.76
41	41 inc 100-120kph	1.69	-29.122	-3.604	-13.786	-142.05
42	42 const120 kph	0.85	2.225	-4.662	-2.632	-13.56
43	43 dec 120-80kph	1.36	0.000	0.000	0.000	0.00
44	44 dec 80-50kph	0.68	0.000	0.000	0.000	0.00
45	45.1 dec 50-0kph	0.76	100.000	100.000	100.000	463.66
	45.2 transeint	0.08	64.528	64.528	64.528	33.24
46	46 idle	1.69	80.145	-62.970	18.561	191.25
		100.00				-100.00

ประวัติผู้วิจัย

นายสมพร ตันติวงศ์ไพศาล เกิดวันที่ 1 กุมภาพันธ์ พ.ศ. 2511 ที่อำเภอสะเดา จังหวัดสงขลา สำเร็จการศึกษาปริญญาตรีวิศวกรรมศาสตร์บัณฑิต สาขาวิศวกรรมเครื่องกล ภาควิชาวิศวกรรมเครื่องกล คณะวิศวกรรมศาสตร์ มหาวิทยาลัยสงขลานครินทร์ ในปีการศึกษา 2533 และเข้าศึกษาต่อในหลักสูตรวิศวกรรมศาสตรมหาบัณฑิต สาขาวิศวกรรมเครื่องกล ภาควิชาวิศวกรรมเครื่องกล คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ในปีการศึกษา 2537