

```

/*****
* Verzion      : 1.1
* Source file  : ConvertD_pub.cpp
* File summary : Conversion processing main file
* Created by   :
* Updated on (created on) : 2003.09.24(2002.10.01)
* Remarks      : Compile switches for compiling are listed below.
* HISTORY     :
* ID  -- DATE --  ---- NOTE -----
* 00  2002.10.01 Created
* 01  2003.10.17 Added Maximum speed processing.
*****/
#ifndef __CONVERT__
#define __CONVERT__

// -----
// Include
// -----
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <time.h>
#include <iostream>
#include <algorithm>
#include <map>
#include <set>
#include <string>
#include <vector>
#include <cstdio>
using namespace std;

#define __STL_HAS_NAMESPACES
#include <unistd.h>

#pragma hdrstop

// -----
// Environmental switch
// -----
#pragma package(smart_init)

// -----
// Structure for 1-line data save
// -----
typedef struct stCsvLineData{
    vector<string> word;
    vector<int>    type;
}stCsvLineData;

```

```

//-----
// CSV data class declaration
//-----
class CCsvFile
{
public:
    CCsvFile(); // Constructor
    virtual ~CCsvFile(); // Destructor

    bool ReadFile(string filename, string delm=" , " ); // File read
    bool SetAtRec(int index ); // Record pointer move

    bool SetDataStr(string str); // 1-line data setting
    bool SetDataStr(char *wkstr, string delm); // 1-line data setting
    bool DeleteData(void); // 1-line data deletion
    string Strings(int index); // 1-line data character string fetch
    int GetDataCnt(void); // 1-line data counter

protected:
    void DataClear(void); // Memory clear processing

    vector<stCsvLineData> vCsvLineData; // Read and stored data
    vector<stCsvLineData>::iterator p_vCsvLineData; // Read and stored reference pointer
};

//-----

//-----
// Table for analysis processing
//-----
typedef struct stCalculateData{
    double fTimes; // Accumulated time (msec)[for analysis]
                  // (sec) [for read]

    int nTimeFlg; // t1-t6 flag
    int nGear; // Gear
    int nGearTime; // Gear determination time duration (msec)
    int nCalcTime; // Required time
    int nPtnReadFlg; // Pattern read flag 1: Read data exists.
    int nWriteFlg; // Location to write pattern file result
    bool bIdle; // Idle state IDLE=true
    bool bClutch; // Clutch state ON =true
    int nFlag; // Holds same flag due to use of previous version
              // 0: IDLE
              // 1: Start
              // 2: Constant speed
              // 3: Stop processing (clutch disengaged)
              // 4: Decelerate (including shift-down)
              // 5: Accelerate (including shift-up)

    double fV; // Speed (for pattern data read)
    double fT; // Time (for pattern data read)
}

```

```

double fA; // Acceleration (km/sec)
double fCarA; // Acceleration (m/msec)
double fbtwnTime; // Time required between basic points (for pattern data read)
double fVref_sp; // Reference speed
double fVana_sp; // Analysis vehicle speed
double fNegrevo; // Engine speed
double fTe; // Engine torque
double fF; // Driving force
double fRL; // R/L rolling resistance
}stCalculateData;

//-----
// Excess force ratio data
//-----
typedef struct stExceedForce{
    int nGear; // Gear position
    double fGearti; // Gear ratio
    double fForcePer; // Transmission efficiency
    double fFreePer; // Excess ratio
    double fMinPer; // Lower-limit engine speed (%-normalized)
    double fMinNe; // Lower-limit engine speed (calculated)
}stExceedForce;

typedef struct stTeFree{
    double fTeFree[20];
    double fNe[20];
    double fMaxNe[20];
    double fF[20];
}stTeFree;

//-----
// Max. torque data
//-----
struct MAX_TORQUE
{
    double fEgtq; // Engine torque
    double fEgrevo; // Engine speed
};

//=====
// Constant declaration (define)
//=====
#define MAIN_ENVFILE "DATA"
#define DEF_FORCE_ON98 0.98 // 98%
#define DEF_FORCE_OFF95 0.95 // 95%
// For GVW margin determination
#define DEF_FORCEOVER (8000.0) // GVW determination 8t
#define DEF_FORCE_OV_GEAR2 2.0 // Excess ratio 2.0 (8t or more)
#define DEF_FORCE_OV_GEAR3 1.7 // Excess ratio 1.7 (8t or more)
#define DEF_FORCE_OV_GEAR4 1.3 // Excess ratio 1.3 (8t or more)

```

#### ConvertD\_pub.cpp

```

// Acceleration (km/sec)
// Acceleration (m/msec)
// Time required between basic points (for pattern data read)
// Reference speed
// Analysis vehicle speed
// Engine speed
// Engine torque
// Driving force
// R/L rolling resistance

```

```

// Gear position
// Gear ratio
// Transmission efficiency
// Excess ratio
// Lower-limit engine speed (%-normalized)
// Lower-limit engine speed (calculated)

```

ConvertD\_pub.cpp

```

#define DEF_FORCE_UN_GEAR2      2.4      // Excess ratio 2.4 (less than 8t)
#define DEF_FORCE_UN_GEAR3      1.7      // Excess ratio 1.7 (less than 8t)
#define DEF_FORCE_UN_GEAR4      1.6      // Excess ratio 1.6 (less than 8t)
// GVW normalized engine speed
#define DEF_FORCE_NE_GEAR2      5         // Normalized engine speed 5%
#define DEF_FORCE_NE_GEAR3      11        // _____11%
#define DEF_FORCE_NE_GEAR4      19        // _____19%
#define DEF_FORCE_NE_GEAR5      26        // _____26%

// Output data (header portion)
#define DEF_PRINT_POS1          "time (s)"
#define DEF_PRINT_POS2          "Vtarget (km/h)"
#define DEF_PRINT_POS3          "Vreal (km/h)"
#define DEF_PRINT_POS4          "Ne (rpm)"
#define DEF_PRINT_POS5          "Te (N-m)"
#define DEF_PRINT_POS6          "N_norm (%)"
#define DEF_PRINT_POS7          "T_norm (%)"
#define DEF_PRINT_POS8          "Shift"

#define DEF_MAXGEAR             (7)        // Max. gear
#define DEF_MAXDIFFER           10.0      // Vehicle speed difference
#define POINTS_MAX              16        // Max. points available for processing
#define RESULTMAX               90        // Number of points to be calculated
//-----
// Output message
//-----
#define MSG_WRITE_FILE_ERROR    "File write error." // File write error

#define BFSZ                    1024
#define NG                      -1
#define OK                      1

#define MAX_GEAR                20 // Max. gear count

//=====
// Class declaration
//=====
class TCalculateProc
{
public:
    TCalculateProc(); // Constructor
    virtual ~TCalculateProc(); // Destructor

    // Function declaration
    bool Init(); // Analysis processing initialization
    bool Init(string FileName); // Analysis processing initialization (with file name designated)
    bool DataClear(); // Analysis data clear processing
    bool EnvRead(); // Environmental data read processing

```

```

ConvertD_pub.cpp
bool PtnRead(); // Pattern file read processing
bool PtnRead(string szFile); // Pattern file read processing (with file name designated)

int CalculateProcess(); // Initiates analysis processing.
void GetCalculateDataFileName(string &szFile); // Obtains analysis file name.
//-----
// Frequently used functions
//-----
void BtwnTimeSet(map<double, stCalculateData>::iterator p_first,
                map<double, stCalculateData>::iterator p_end); // Sets section time for specified section.
void BtwnCarASet(map<double, stCalculateData>::iterator p_first,
                map<double, stCalculateData>::iterator p_end); // Sets acceleration for specified section.

//-----
// Analysis processing steps
//-----
bool Calculate_progress1(); // Calculates reference vehicle speed and reference acceleration.
bool Calculate_progress2(); // Determines flag for pattern compatible with previous version.
bool Calculate_progress3(); // Sets gear (according to engine speed).

//-----
// Section setting functions
//-----
bool Calculate_T1T2Set(); // Search and section setting for start (t1,t2)
bool Calculate_Start_Following(
    map<double, stCalculateData>::iterator &p_first); // Processing until analysis vehicle speed reaches reference vehicle speed

bool Calculate_T3Set(map<double, stCalculateData>::iterator p_first,
                    map<double, stCalculateData>::iterator &p_second); // Section setting for acceleration (t3)
bool Calculate_RatedUp(map<double, stCalculateData>::iterator p_first,
                      map<double, stCalculateData>::iterator p_second,
                      int &NewGear, int OrgGear); // Rated Gear Up Module
bool Calculate_RatedDown(map<double, stCalculateData>::iterator p_first,
                        map<double, stCalculateData>::iterator p_second,
                        int &NewGear, int OrgGear); // Rated Gear Down Module
bool Calculate_T3Check(map<double, stCalculateData>::iterator p_first,
                      map<double, stCalculateData>::iterator p_second,
                      int tmpGear, int OrgGear); // Running capability check for section setting
bool Calculate_GearUp(map<double, stCalculateData>::iterator p_first,
                     map<double, stCalculateData>::iterator p_second,
                     double &fDiffDistance,
                     int &tmpGear); // Shift-up until stationary engine speed is exceeded
bool Calculate_MaxNeGearUp(map<double, stCalculateData>::iterator p_first,
                           map<double, stCalculateData>::iterator p_second,
                           int &tmpGear); // Shift-up until stationary engine speed is exceeded
bool Calculate_TeMinGear(map<double, stCalculateData>::iterator p_first,
                         int nPos,
                         int &nGear); // Shift-down until stationary engine speed is exceeded
bool Calculate_T6Set(map<double, stCalculateData>::iterator p_first,
                    map<double, stCalculateData>::iterator p_second); // Section setting for deceleration (t6)

```

ConvertD\_pub.cpp

```

bool Calculate_SetIDLE(
    map<double, stCalculateData>::iterator p_first,
    map<double, stCalculateData>::iterator p_second ); // IDLE section processing
bool Calculate_Set_Start(
    map<double, stCalculateData>::iterator p_first,
    map<double, stCalculateData>::iterator p_second ); // Start section gear setup processing
bool Calculate_Set_SteadyState(
    map<double, stCalculateData>::iterator p_first,
    map<double, stCalculateData>::iterator p_second ); // Constant speed section gear setup processing
bool Calculate_Set_Deceleration(
    map<double, stCalculateData>::iterator p_first,
    map<double, stCalculateData>::iterator p_second ); // Deceleration section gear setup processing
bool Calculate_Set_Acceleration(
    map<double, stCalculateData>::iterator p_first,
    map<double, stCalculateData>::iterator p_second ); // Acceleration section gear setup processing

void DispCalculateData();
int WriteAllCalculateData();

private:
string m_OutputData; // Output file name
//*****System parameter setting*****
double m_fPAI; // Circle circumference ratio to diameter
//Analysis parameter
double m_fUnitTime; // Analysis interval (sec)
int m_nMaxGear; // Max. number of gears
//-----
// Vehicle information setting
double m_fCarMaxW; // Max. payload (Kg)
double m_fCarIniW; // Empty vehicle mass (kg)
double m_fPersons; // Riding capacity
double m_fPersonW; // Weight per person
double m_fCarMe; // Empty vehicle weight of car (kN)
double m_fCarMc; // Payload of car (kN)
double m_fPersonM; // Weight of riding capacity (kN)
double m_fEFact; // Inertial weight ratio equivalent in rotation section (E_FACT)
double m_fMFact; // Inertial weight ratio equivalent in rotation section (M_FACT)

double m_fTarR; // Tire rolling radius data
double m_fOverHeight; // Overall vehicle height
double m_fOverWidth; // Overall vehicle width
//-----
double m_fClutch_Release; // Clutch release normalized engine speed (%)
double m_fClutch_Meet; // Clutch meet normalized engine speed (%)
double m_fClutch_ReleaseNe; // Clutch release engine speed
double m_fClutch_MeetNe; // Clutch meet engine speed
//-----
// Engine specifications setting
double m_fRatedOutputRotation; // Rated output engine speed [rpm]
double m_fOutputRotation; // Loaded limit engine speed [rpm]

```

```

double m_fRatedTorque;
double m_fIdleNe;
//-----

// Gear setting
vector<double> m_fGearHi;
double m_fLastReduceGear;
double m_fUd;
//-----

// Starting condition initial value
int m_nInitGear;
//-----
// [Gearshift condition initial value]
double m_fTg;
//-----

//*****System parameter setting*****
//-----
// Other member variables
double m_fFixedNe;
double m_fKg;
//-----

```

private:

```

//-----
// Processing used in initialization
//-----
double GetMaxNe();

bool GetKG(double &fKg);
bool GetExceedF();
double GetGearPass( int nGear );

int ReadMaxTorqueData(string FileName);
double GetLineReviseMaxTorque(double fNe);

bool CalcForceWithNeSet(int nGear, double Te, double fNe,
                        double &fF );

bool CheckForce(int nGear, double fVana,
                double fCarA );
bool CalcTeMaxSp(int nGear, double fTm,
                 double fVbef, double &fV, double &fNe );

//-----
// Calculation logic
//-----
double CalcRL(double fV);

```

```

ConvertD_pub.cpp
// Rated torque
// Idling (IDLE) engine speed

// Gear ratio
// Final reduction ratio
// Final reduction ratio (transmission efficiency)

// Starting gear initial value

// Gear hold time (tg:sec)

// Max. engine speed, rated engine speed
// Gravitational acceleration

```

```

// Max. engine speed setting

// Gravitational acceleration setting
// Excess force ratio data read processing
// Obtains gear transmission efficiency.

// Sets max. torque data table.

// Obtains max. torque data, and executes calculation.

// Sets driving force.

// Determines shift-up availability.

// Target-speed follow processing

// Calculates rolling resistance.

```

```

double  GetCarWeight(bool bFlag, int nGear=0);
int     GetGearHi(int nGear,
                double &fGearHi);
int     GetGearIN(int nGear,
                double &fGearti);
int     GetNe( int nGear, double fVg,
                double &fNe);
int     GetV( int nGear, double fNe,
                double &fVg);
int     GetTe( int nGear, double fV, double fA,
                double nNe, double &fTe);
int     GetTe_NotRevise( int nGear, double fV, double fA,
                double nNe, double &fTe);

//-----
// Spline complement relationship
//-----
//-----
// Analysis file related
//-----
int     WriteHead(FILE *fp);

public:
map<double, stCalculateData> setCalculateData;
map<double, stCalculateData>::iterator p_setCalculateData;

private:
set<MAX_TORQUE> m_MaxTorque;
set<MAX_TORQUE>::iterator p_MaxTorque;
set<stExceedForce> m_ExceedForce;
set<stExceedForce>::iterator p_ExceedForce;

//-----
// Max. torque data
//-----
// Max. torque data
// Excess force ratio table
// ----- pointer

//-----
// Max. torque data operator
//-----
friend bool operator<(const MAX_TORQUE& a, const MAX_TORQUE& b ){
    // Uniquely sorted by engine speed.
    return( a.fEgrevo < b.fEgrevo );
};

//-----
// Data operator for excess force ratio
//-----
friend bool operator<(const stExceedForce& a, const stExceedForce& b ){
    // Uniquely sorted by gear.
    return( a.nGear < b.nGear );
};

};

//=====
// Class declaration

```

```

ConvertD_pub.cpp
// Reads and calculates vehicle body weight.
// Obtains gear ratio.
// Obtains gear ratio.
// Obtains engine speed.
// Obtains speed.
// Calculates torque.
// Calculates torque (no correction).

```



```

//=====
class TCommFun
{
public:
    TCommFun();
private:

public:
    bool    AStrToDouble(string szData,
                       double &fData);

    void    Trim(string &str );
    bool    FileExists( string filename );
private :

public :
    virtual ~TCommFun();

};

//-----
// Class declaration
//-----
TCalculateProc *CalculateProc;
TCommFun *CommFun;
//-----
/**/
/*****
* Function name      : CCsvFile
* Function summary   : Constructor
* Explanation        : Class constructor
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : None
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
CCsvFile::CCsvFile()
{
    return;
}

/**/
/*****
* Function name      : ~CCsvFile
* Function summary   : Destructor
* Explanation        : Class destructor

```

```

*                                     :
* Argument (input)                   : None
* Argument (output)                  : None
* Argument (I/O)                     : None
* Return value                       : None
* Created by                         :
* Updated on (created on)            :
* Remarks                             :
*****/
CCsvFile::~CCsvFile()
{
    //-----
    // Clear memory.
    //-----
    DataClear();

    return;
}

/**/
*****/
* Function name                       : DataClear
* Function summary                    : Memory clear processing
* Explanation                         : Memory data is cleared.
*                                     :
* Argument (input)                   : None
* Argument (output)                  : None
* Argument (I/O)                     : None
* Return value                       : None
* Created by                         :
* Updated on (created on)            :
* Remarks                             :
*****/
void CCsvFile::DataClear(void)
{
    //-----
    // Read file memory area deletion processing
    //-----
    if( vCsvLineData.empty() != true ){
        for( p_vCsvLineData = vCsvLineData.begin();
            p_vCsvLineData != vCsvLineData.end();
            p_vCsvLineData++ ){
            // Loops for number of file read lines.
            if( p_vCsvLineData->word.empty() != true ){ // In case of 1-line data
                p_vCsvLineData->word.erase( p_vCsvLineData->word.begin(),
                    p_vCsvLineData->word.end() );
                p_vCsvLineData->word.clear(); // Clears 1-line data.
            }
            if( p_vCsvLineData->type.empty() != true ){ // In case of 1-line data
                p_vCsvLineData->type.erase( p_vCsvLineData->type.begin(),
                    p_vCsvLineData->type.end() );
                p_vCsvLineData->type.clear(); // Clears 1-line data.
            }
        }
    }
}

```

```

    }
    vCsvLineData.erase( vCsvLineData.begin(),
                        vCsvLineData.end() );
    vCsvLineData.clear();
}

return;
}
/**/
/*****
* Function name      : ReadFile
* Function summary   : File read
* Explanation        : File is read and set in internal data.
*
* Argument (input)   : strFileName : File name
* Argument (input)   : delm        : Delimiter
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool GCsvFile::ReadFile(string strFileName, string delm )
{
    string tmpStr; // 1-line read character string buffer
    FILE *fp;
    char *p;
    char wkstr[4096];

    // Reads and opens file.
    fp = fopen( strFileName.c_str(), "r" );

    if((fp == NULL)|| (ferror(fp))) return false; // File open failure

    //-----
    // Internal data clear
    //-----
    DataClear();

    //-----
    // File read
    //-----
    while( !feof(fp) ){
        memset( wkstr, 0x00, sizeof( wkstr ) );
        p = fgets( wkstr, 4096, fp ); // 1-line read
        if( p == NULL ) break;
        if( ferror(fp) ) break;

        // 1-line data setting

```

```

        tmpStr = string( wkstr );
        if(( delm == ";" ) || ( delm == ", " )){
            SetDataStr( tmpStr );
        }else{
            SetDataStr( &wkstr[0], delm );
        }
    }
    fclose(fp);

    return true;
}
/**/
/*****
* Function name      : SetAtRec
* Function summary   : Record pointer move processing
* Explanation        : File record pointer is moved.
*
* Argument (input)   : index : Record
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool CCsvFile::SetAtRec(int index )
{
    int i;

    if(( (int)(vCsvLineData.size()) >= index )&&
        ( index > 0 )){
        for( p_vCsvLineData = vCsvLineData.begin(), i = 1;
            i != index; i++){
            p_vCsvLineData++;
        }
    }else{
        p_vCsvLineData = vCsvLineData.end();
        return false;
    }

    return true;
}
/**/
/*****
* Function name      : SetDataStr
* Function summary   : 1-line data setup processing
* Explanation        : 1-line data from file is set.
*
* Argument (input)   : str : Set 1-line character string
* Argument (output)  : None
* Argument (I/O)     : None
*****/

```

```

* Return value      : true : Normal   false : Failure
* Created by       :
* Updated on (created on) :
* Remarks          :
*****/
bool CCsvFile::SetDataStr( string str)
{
    stCsvLineData tmpCsvLineData;
    char wkstr[256]; // Read character string buffer
    char wkstr_wd[256];
    int i;
    int tmp_delm; // Flag indicating delimiting section
    int tmp_delmIndex; // Delimiting start position
    string tmpStr;

    if( tmpCsvLineData.word.empty() != true ){
        tmpCsvLineData.word.erase( tmpCsvLineData.word.begin(),
                                   tmpCsvLineData.word.end() );
        tmpCsvLineData.type.erase( tmpCsvLineData.type.begin(),
                                   tmpCsvLineData.type.end() );
        tmpCsvLineData.word.clear();
        tmpCsvLineData.type.clear();
    }
    // Checks by obtaining characters one by one.
    tmp_delm = 0;
    tmp_delmIndex = 0;

    sprintf( wkstr, "%s", str.c_str() );
    for( i = 0; wkstr[i] != 0x00; i++){
        if( wkstr[i] == ',' ){
            // Delimiting section start?
            if( tmp_delm == 0 ){
                tmp_delm = 1; // Delimiting section start occurrence
                i++; // Sets delimiting position.
                tmp_delmIndex = i; // Sets delimiting start position.
            } else {
                // Delimiting section end?
                memset( wkstr_wd, 0x00, sizeof( wkstr_wd ) );
                memcpy( wkstr_wd, &wkstr[tmp_delmIndex],
                       i - tmp_delmIndex ); // Sets delimiting position.
                tmpStr = string( wkstr_wd );
                tmpCsvLineData.word.push_back( tmpStr );
                tmpCsvLineData.type.push_back( tmp_delm );
                tmp_delm = 0;
                // Sets next delimiting start position.
                i++;
                tmp_delmIndex = i;
            }
        }
        while(1){
            if( wkstr[i] == 0x00 ){
                i--;
                break;
            }
        }
    }
}

```

```

    }
    if(( wkstr[i] == ' ' )||
        ( wkstr[i] == '¥t' )||
        ( wkstr[i] == '¥r' )||
        ( wkstr[i] == '¥n' )||
        ( wkstr[i] == ',' )){
        i++;
        tmp_delmIndex = i;
    }else{
        i--;
        break;
    }
}
}
}else if(( wkstr[i] == ' ' )||
        ( wkstr[i] == '¥t' )||
        ( wkstr[i] == '¥r' )||
        ( wkstr[i] == '¥n' )||
        ( wkstr[i] == ',' )){
    if( tmp_delm == 1 ){
        // Normal delimiting position found?
        // If character " " has already appeared
    }else{
        memset( wkstr_wd, 0x00, sizeof( wkstr_wd ));
        memcpy( wkstr_wd, &wkstr[tmp_delmIndex],
                i - tmp_delmIndex );
        // Sets delimiting position.
        tmpStr = string( wkstr_wd );
        tmpCsvLineData.word.push_back( tmpStr );
        tmpCsvLineData.type.push_back( tmp_delm );
        // Sets next delimiting start position.
        tmp_delmIndex = i;
        while(1){
            if( wkstr[i] == 0x00 ){
                i--;
                break;
            }
            if(( wkstr[i] == ' ' )||
                ( wkstr[i] == '¥t' )||
                ( wkstr[i] == '¥r' )||
                ( wkstr[i] == '¥n' )||
                ( wkstr[i] == ',' )){
                i++;
                tmp_delmIndex = i;
            }else{
                i--;
                break;
            }
        }
    }
}
}
}
if(( wkstr[i-1] != ' ' )&&

```

```

    ( wkstr[i-1] != '\t' )&&
    ( wkstr[i-1] != '\r' )&&
    ( wkstr[i-1] != '\n' )&&
    ( wkstr[i-1] != ',' ) ) {
    memset( wkstr_wd, 0x00, sizeof( wkstr_wd ) );
    memcpy( wkstr_wd, &wkstr[tmp_delmIndex],
           i - tmp_delmIndex );
    tmpStr = string( wkstr_wd );
    tmpCsvLineData.word.push_back( tmpStr );
    tmpCsvLineData.type.push_back( tmp_delm );
}

vCsvLineData.push_back( tmpCsvLineData );

return true;
}
/**/
/*****
* Function name      : SetDataStr
* Function summary   : 1-line data setup processing (with delimiter)
* Explanation        : 1-line data from file is set.
*
* Argument (input)   : wkstr : Set 1-line character string
* Argument (input)   : delm  : Delimiter
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool CCsvFile::SetDataStr(char *wkstr, string delm)
{
    stCsvLineData tmpCsvLineData;
    char wkstr_wd[4096];
    int i;
    int tmp_delm;
    int tmp_delmIndex;
    string tmpStr;

    // Flag indicating delimiting section
    // Delimiting start position

    if( tmpCsvLineData.word.empty() != true ){
        tmpCsvLineData.word.erase( tmpCsvLineData.word.begin(),
                                   tmpCsvLineData.word.end() );
        tmpCsvLineData.word.clear();
        tmpCsvLineData.type.erase( tmpCsvLineData.type.begin(),
                                   tmpCsvLineData.type.end() );
        tmpCsvLineData.type.clear();
    }
    // Checks by obtaining characters one by one.
    tmp_delm = 0;

```

```

tmp_delmIndex = 0;
for( i = 0; wkstr[i] != 0x00; i++){
    if( wkstr[i] == ',' ){
        // Delimiting section start?
        if( tmp_delm == 0 ){
            tmp_delm = 1;
            if( wkstr[i+1] != '"' ){
                i++;
                tmp_delmIndex = i;
            }else{
                tmp_delmIndex = i+1;
            }
        }else{
            // Delimiting section end?
            memset( wkstr_wd, 0x00, sizeof( wkstr_wd ) );
            if( i != tmp_delmIndex ){
                memcpy( wkstr_wd, &wkstr[tmp_delmIndex],
                    i - tmp_delmIndex );
            }
            tmpStr = string( wkstr_wd );
            tmpCsvLineData.word.push_back( tmpStr );
            tmpCsvLineData.type.push_back( tmp_delm );
            tmp_delm = 0;
            // Sets next delimiting start position.
            i++;
            tmp_delmIndex = i;
            while(1){
                if( wkstr[i] == 0x00 ){
                    i--;
                    break;
                }
                if( delm.find( wkstr[i], 0 ) < delm.size() ){
                    i++;
                    tmp_delmIndex = i;
                }else{
                    i--;
                    break;
                }
            }
        }
    }else if( delm.find( wkstr[i], 0 ) < delm.size() ){
        if( tmp_delm == 1 ){
            // If character " has already appeared
            // the data is regarded as character data.
        }else{
            memset( wkstr_wd, 0x00, sizeof( wkstr_wd ) );
            if( i != tmp_delmIndex ){
                memcpy( wkstr_wd, &wkstr[tmp_delmIndex],
                    i - tmp_delmIndex );
            }
            tmpStr = string( wkstr_wd );
            tmpCsvLineData.word.push_back( tmpStr );
        }
    }
}

```



```

tmpCsvLineData.type.push_back( tmp_delm );
// Sets next delimiting start position.
if( delm.find( wkstr[i+1], 0 ) < delm.size() ){
    tmp_delmIndex = i+1;
    continue;
}
tmp_delmIndex = i;
while(1){
    if( wkstr[i] == 0x00 ){
        i--;
        break;
    }
    if( delm.find( wkstr[i], 0 ) < delm.size() ){
        i++;
        tmp_delmIndex = i;
    }else{
        i--;
        break;
    }
}
}
}
}

if( !(delm.find( wkstr[i-1], 0 ) < delm.size() ) ){
    memset( wkstr_wd, 0x00, sizeof( wkstr_wd ) );
    memcpy( wkstr_wd, &wkstr[tmp_delmIndex],
           i - tmp_delmIndex );
    tmpStr = string( wkstr_wd );
    tmpCsvLineData.word.push_back( tmpStr );
    tmpCsvLineData.type.push_back( tmp_delm );
}

vCsvLineData.push_back( tmpCsvLineData );

return true;
}
/**/
/*****
* Function name      : DeleteData
* Function summary   : 1-line data deletion processing
* Explanation        : 1-line data is deleted from memory.
*                   :
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool CCsvFile::DeleteData( void)

```

```

// If next is also delimiting position

```

```

// Sets delimiting position.

```

```

{
    if( p_vCsvLineData != vCsvLineData.end() ){
        if( vCsvLineData.empty() != true ){
            vCsvLineData.erase( vCsvLineData.begin(), vCsvLineData.end() );
            vCsvLineData.clear();
        }
    }else{
        return false;
    }
    p_vCsvLineData = vCsvLineData.end();

    return true;
}
/**/
/*****
* Function name      : Strings
* Function summary   : 1-line data acquisition processing
* Explanation        : 1-line data is obtained from memory.
*                   :
* Argument (input)   : index : Record
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : string 1-line data character string
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
string CCsvFile::Strings(int index)
{
    if( p_vCsvLineData != vCsvLineData.end() ){
        if(( index < (int)(p_vCsvLineData->word.size()) )&&
            ( index >= 0 )){
            return( p_vCsvLineData->word[index]);
        }
    }
    return("");
}
/**/
/*****
* Function name      : GetDataCnt
* Function summary   : 1-line data counter processing
* Explanation        : Memory records are counted.
*                   :
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : int Record count
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/

```

```

int CCsvFile::GetDataCnt(void)
{
    if( p_vCsvLineData != vCsvLineData.end() ){
        return( (int)(p_vCsvLineData->word.size()) );
    }else{
        return( 0 );
    }
}

/**/
/*****
* Function name      : TCalculateProc
* Function summary   : Constructor
* Explanation        : Class constructor
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : None
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
TCalculateProc::TCalculateProc()
{
    // Conversion infomation
    cout << "Ver 1.1 ";

    m_OutputData = "";

    return;
}

/**/
/*****
* Function name      : ~TCalculateProc
* Function summary   : Destructor
* Explanation        : Class destructor
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : None
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
TCalculateProc::~TCalculateProc()
{
    // *****/
    // Internal data clear
}

```

```

// Initializes output file name.

```

```

// *****
DataClear(); // Clears analysis data.

return;
}
/**/
/*****
* Function name      : Init
* Function summary   : Analysis processing initialization
* Explanation        : Convert processing is initialized.
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Init()
{
    bool bRet; // Function return value

    // *****
    // Internal data clear
    // *****
    bRet = DataClear(); // Clears analysis data.
    if( bRet != true ){ // If return value contains error
        return( bRet ); // Process ends.
    }

    // *****
    // Environmental data read
    // *****
    bRet = EnvRead(); // Reads environmental data.
    if( bRet != true ){ // If return value contains error
        return( bRet ); // Process ends.
    }

    return(true); // Returns if normal end.
}
/**/
/*****
* Function name      : Init
* Function summary   : Analysis processing initialization (with output file provided)
* Explanation        : Convert processing is initialized (with output file provided).
*
* Argument (input)   : FileName : Output file name
* Argument (output)  : None
* Argument (I/O)     : None

```

```

* Return value      : true : Normal   false : Failure
* Created by       :
* Updated on (created on) :
* Remarks          :
*****/
bool TCalculateProc::Init(string FileName)
{
    bool bRet;

    m_OutputData = FileName;
    bRet = Init();

    return(bRet); // Returns if normal end.
}
/**/
/*****
* Function name      : DataClear
* Function summary   : Processed data area clear
* Explanation        : Processed data area is cleared.
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by        :
* Updated on (created on) :
* Remarks           :
*****/
bool TCalculateProc::DataClear()
{
    // *****
    // Check whether analysis data is stored,
    // and clear the data if stored.
    // *****
    if( setCalculateData.empty() != true ){ // If analysis data is stored
        setCalculateData.erase( setCalculateData.begin(), // Clears analysis data.
                                setCalculateData.end() );
        setCalculateData.clear();
    }

    return( true ); // Returns if normal.
}
/**/
/*****
* Function name      : EnvRead
* Function summary   : Environmental data read processing
* Explanation        : Environmental file is read and set in parameters.
*

```

```

* Argument (input)      : None
* Argument (output)    : None
* Argument (I/O)       : None
* Return value         : true : Normal   false : Failure
* Created by           :
* Updated on (created on) :
* Remarks              :

```

```

*****/

```

```

bool TCalculateProc::EnvRead()

```

```

{
  CCsvFile *EnvFileNames;
  CCsvFile *EnvDataName;
  double   fW1, fW2, fWMax;
  int      nRet, i;
  double   fKg ;
  double   fWeight;
  double   fGearHi;
  bool     bRet;
  string   szData;

  // *****//
  // System parameters
  // *****//
  // -----//
  // Analysis interval (sec)
  // -----//
  m_fUnitTime = 1.0; // Sets analysis interval in internal data.
  // -----//
  // Start gear position initial value
  // -----//
  m_nInitGear = 2; // Sets starting gear position initial value in internal data.
  // -----//
  // Gear hold time (tg:sec)
  // -----//
  m_fTg = 3.0; // Sets gear hold time (tg:sec) in internal data.
  // -----//
  // Select optimum gear position.
  // -----//
  m_fUd = 0.95; // Sets final reduction ratio (transmission efficiency) to fixed
value 0.95.
  // -----//
  // Inertial weight ratio equivalent in rotation section (E_FACT)
  // -----//
  m_fEFact = 0.03; // Fixes E_FACT to 0.03.
  // -----//
  // Inertial weight ratio equivalent in rotation section (M_FACT)
  // -----//
  m_fMFact = 0.07; // Fixes M_FACT to 0.07.
  // -----//
  // Weight per person

```

```

// -----
m_fPersonW = 55.0; // Weight per person (55kg)
// *****//
// Clutch meet, clutch release
// *****//
m_fClutch_Release = 4.0; // Sets clutch release normalized engine speed in internal data.
m_fClutch_Meet = 5.0; // Sets clutch meet normalized engine speed in internal data.
// -----
// Setting of circle circumference ratio to diameter
// -----
m_fPAI = 3.14; // Sets circle circumference ratio to diameter in internal data.
m_fKg = 9.8; // Sets gravitational acceleration.

// -----
// Read environment definition file, and obtain environmental data.
// -----
bRet = CommFun->FileExists(MAIN_ENVFILE); // Environment file exists?
if( bRet != true ){ // If non-existing
    return( false );
}

// -----
// Obtain environmental data file name.
// -----
EnvFileNames = new CCsvFile();
bRet = EnvFileNames->ReadFile(MAIN_ENVFILE); // File read
if( bRet != true ){ // Deletes data read from environmental data file.
    delete EnvFileNames;
    return( false );
}

// -----
// Pattern file exists
// -----
EnvFileNames->SetAtRec(1); // Moves to next record.
bRet = CommFun->FileExists(EnvFileNames->Strings(0)); // Pattern definition exists?
if( bRet == true ){ // If file exists
    nRet = PtnRead(EnvFileNames->Strings(0)); // Reads pattern file data.
    if( nRet == NG ){ // Deletes data read from environmental data file.
        delete EnvFileNames;
        return( false );
    }
} else{ // Deletes data read from environmental data file.
    delete EnvFileNames;
    return( false );
}

// -----
// Environmental data read
// -----
EnvFileNames->SetAtRec(2);

```

```

bRet = CommFun->FileExists(EnvFileNames->Strings(0));
if( bRet != true ){
    delete EnvFileNames;
    return( false );
}
EnvDataName = new CCsvFile();
bRet = EnvDataName->ReadFile(EnvFileNames->Strings(0));
if( bRet != true ){
    delete EnvDataName;
    delete EnvFileNames;
    return( false );
}

// -----
// Curb vehicle weight
// -----
EnvDataName->SetAtRec(1);
szData = EnvDataName->Strings(0);
if (szData != ""){
    fW2 = atof(szData.c_str());
} else{
    delete EnvDataName;
    delete EnvFileNames;
    return( false );
}

// -----
// Test payload
// -----
EnvDataName->SetAtRec(2);
szData = EnvDataName->Strings(0);
if (szData != ""){
    fWMax = atof(szData.c_str());
} else{
    delete EnvDataName;
    delete EnvFileNames;
    return( false );
}

// -----
// Calculates half load.
// -----
fW1 = fWMax /2.0;

// -----
// Riding capacity information
// -----
EnvDataName->SetAtRec(3);
szData = EnvDataName->Strings(0);
if (szData != ""){
    m_fPersons = atof(szData.c_str());
} else{

```

ConvertD\_pub.cpp

```

// If environmental data file definition exists
// If non-existing
// Deletes data read from environmental data file.

// File read

// Deletes data read from environmental data file.
// Deletes data read from environmental data file.

// Moves to first record.
// Obtains curb vehicle weight.
// If obtained data exists
// Sets curb vehicle weight.
// If no obtained data exists
// Deletes data read from environmental data file.
// Deletes data read from environmental data file.

// Moves to second record.
// Obtains max. payload.
// If obtained data exists
// Sets max. payload.
// If no obtained data exists
// Deletes data read from environmental data file.
// Deletes data read from environmental data file.

// Obtains test payload.

// Moves to third record.
// Obtains test payload.
// If obtained data exists
// Obtains number of riding capacity.

```



```

    m_fPersons = 0.0;
}

// -----
// Gravitational acceleration
// -----
bRet = GetKG(fKg);
if (bRet == false) {
    delete EnvDataName;
    delete EnvFileNames;
    return( false );
}
fKg = fKg/1000.0;
// -----
// Setting of vehicle body weight and riding capacity weight data
// -----
m_fCarMaxW = fWMax;
m_fCarIniW = fW2;
fWeight = m_fPersonW * m_fPersons;
m_fCarMc = fW1 ;
m_fCarMe = fW2 ;
m_fPersonM = fWeight ;

// -----
// Overall vehicle height
// -----
EnvDataName->SetAtRec(4);
szData = EnvDataName->Strings(0);
if (szData != "") {
    m_fOverHeight = atof(szData.c_str());
} else {
    m_fOverHeight = 0.0;
}

// -----
// Overall vehicle width
// -----
EnvDataName->SetAtRec(5);
szData = EnvDataName->Strings(0);
if (szData != "") {
    m_fOverWidth = atof(szData.c_str());
} else {
    m_fOverWidth = 0.0;
}

// -----
// Tire dynamic rolling radius
// -----
EnvDataName->SetAtRec(6);
szData = EnvDataName->Strings(0);
if (szData != "") {

```

```

// Obtains gravitational acceleration.
// If return value contains error
// Deletes data read from environmental data file.
// Deletes data read from environmental data file.
// Process ends.

```

```

// kN

```

```

// Sets max. payload (kg).
// Sets empty vehicle mass (kg).
// Sets riding capacity weight.
// Test payload of car (kg)
// Curb vehicle weight of car (kg)
// Weight of riding capacity (kg)

```

```

// Moves to fourth record.
// Obtains overall height.
// If obtained data exists
// Obtains overall vehicle height.

```

```

// Moves to fifth record.
// Obtains overall width.
// If obtained data exists
// Obtains overall vehicle width.

```

```

// Moves to sixth record.
// Obtains tire radius.
// If obtained data exists

```

```

    m_fTarR = atof(szData.c_str());
} else{
    m_fTarR = 0.0;
}

// -----
// Top gear (Number of gear position)
// -----
EnvDataName->SetAtRec(7);
szData = EnvDataName->Strings(0);
if(szData == ""){
    m_nMaxGear = DEF_MAXGEAR;
} else{
    m_nMaxGear = atoi(szData.c_str());
}

// -----
// Gear ratio read
// -----
if( m_fGearHi.empty() != true ){
    m_fGearHi.erase( m_fGearHi.begin(), m_fGearHi.end() );
    m_fGearHi.clear();
}
for( i = 1; i <= m_nMaxGear; i++ ){
    EnvDataName->SetAtRec(7+i);
    szData = EnvDataName->Strings(0);
    if(szData == ""){
        fGearHi = 1.0;
    } else{
        fGearHi = atof(szData.c_str());
    }
    m_fGearHi.push_back( fGearHi );
}

// -----
// Final reduction ratio
// -----
EnvDataName->SetAtRec(8+m_nMaxGear);
szData = EnvDataName->Strings(0);
if (szData != ""){
    m_fLastReduceGear = atof(szData.c_str());
} else{
    m_fLastReduceGear = 4.711;
}

// -----
// Idling engine speed
// -----
EnvDataName->SetAtRec(9+m_nMaxGear);
szData = EnvDataName->Strings(0);
if (szData != ""){

```

```

// Obtains tire rolling radius.

```

```

// Moves to seventh record.
// Top gear read
// If return value contains error
// Sets top gear to fixed value (7).
// If read completes normally
// Sets top gear in internal data.

```

```

// If gear ratio already exists
// Clears data.

```

```

// Reads gear ratio.
// Moves to "7+i"th record.
// Reads gear ratio.
// If return value contains error
// Sets gear ratio to 1.
// If read completes normally
// Sets gear ratio in internal data.

```

```

// Stores gear ratio.

```

```

// Moves to "number of gear position + 8"th record.
// Acquisition of final reduction ratio.
// If obtained data exists
// Obtains final reduction ratio.

```

```

// Moves to "number of gear position + 9"th record.
// Acquisition of idling engine speed
// If obtained data exists

```

```

    m_fIdleNe = atof(szData.c_str());
} else{
    m_fIdleNe = 500.0;
}

// -----
// Rated output engine speed
// -----
EnvDataName->SetAtRec(10+m_nMaxGear);
szData = EnvDataName->Strings(0);
if (szData != ""){
    m_fRatedOutputRotation = atof(szData.c_str());
} else{
    m_fRatedOutputRotation = 3000.0;
}

// -----
// Loaded limit engine speed
// -----
EnvDataName->SetAtRec(11+m_nMaxGear);
szData = EnvDataName->Strings(0);
if (szData != ""){
    m_fOutputRotation = atof(szData.c_str());
} else{
    m_fOutputRotation = 3100.0;
}

// -----
// Rated engine speed
// -----
m_fFixedNe = GetMaxNe();

delete EnvDataName;

// *****
// Setting of clutch meet and release revolutions //
// *****
m_fClutch_ReleaseNe = ( m_fFixedNe - m_fIdleNe ) *
    m_fClutch_Release/100.0 + m_fIdleNe;
m_fClutch_MeetNe    = ( m_fFixedNe - m_fIdleNe ) *
    m_fClutch_Meet/100.0 + m_fIdleNe;

// -----
// Max. torque data
// -----
EnvFileNames->SetAtRec(3);
bRet = CommFun->FileExists(EnvFileNames->Strings(0));
if( bRet != true ){
    delete EnvFileNames;
    return( false );
}
nRet = ReadMaxTorqueData(EnvFileNames->Strings(0));

```

// Obtains idling engine speed.

// Moves to "number of gear position + 10"th record.  
// Acquisition of rated output engine speed  
// If obtained data exists  
// Obtains rated output engine speed.// Moves to "number of gear position + 11"th record.  
// Acquisition of loaded limit engine speed  
// If obtained data exists  
// Obtains loaded limit engine speed.

// Rated engine speed setting

// Deletes data read from environmental data file.

// Calculates clutch release engine speed.

// Calculates clutch meet engine speed.

// Torque file definition exists?  
// If no file exists  
// Deletes data read from environmental data file.

// Acquisition of max. torque data

```

if (nRet == NG){
    delete EnvFileNames;
    return( false );
}

delete EnvFileNames;

// *****//
// Setting of excess force ratio data
// *****//
nRet = GetExceedF();
if (nRet == NG){
    return( false );
}

return( true );
}
/**/
/*****
* Function name      : CalculateProcess
* Function summary   : Main processing of Convert
* Explanation        : Main processing of Convert is executed.
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : OK : Normal   NG: Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
int  TCalculateProc::CalculateProcess()
{
    bool bRet;

    bRet = Calculate_progress1();
    if( bRet == false ){
        return( NG );
    }

    bRet = Calculate_progress2();
    if( bRet == false ){
        return( NG );
    }

    bRet = Calculate_T1T2Set();
    if( bRet == false ){
        return( NG );
    }

    bRet = Calculate_progress3();

```

```

// If return value contains error
// Deletes data read from environmental data file.
// Process ends.

```

```

// Deletes data read from environmental data file.

```

```

// Obtains excess force ratio.
// If return value contains error
// Process ends.

```

```

// Returns if normal.

```

```

// Calculates reference vehicle speed and acceleration.

```

```

// Makes compatible with previous version.

```

```

// Calculates T1 and T2.

```

```

// Determines gear position, and sets parameters.

```

```

    if( bRet == false ){
        return( NG );
    }

    DispCalculateData(); // Displays parameter information.
    // Data write
    WriteAllCalculateData();

    return( OK );
}
/**/
/*****
* Function name      : PtnRead
* Function summary   : Pattern setup processing
* Explanation        : Pattern data for Convert processing is set.
*
* Argument (input)   : szFile : read pattern file name
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::PtnRead(string szFile)
{
    map<double, stCalculateData>::iterator p_setStart;
    map<double, stCalculateData>::iterator p_setEnd;
    map<double, stCalculateData>::iterator p_next; // Next pointer
    stCalculateData tmpCalculateData;
    string szData;
    string szPtn1015File;
    string szTmp;
    FILE *fp;
    int row;
    char *p, buf[200];
    double tmpTime; // Obtained time
    double tmpAllTime; // Accumulated time
    double tmpSetTime; // Set time
    double tmpBeftime; // Previous set time
    double tmpfV; // Vehicle speed
    int nGear; // Selected gear
    double p1_data;
    double p2_data;

    nGear = 0;
    p1_data = 0.0;
    p2_data = 0.0;
    tmpAllTime = 0.0; // Initializes accumulated seconds
    //-----

```

```

// Pattern file read processing Step17
// (Obtain accumulated time.)
//-----
if((fp = fopen( szFile.c_str(), "rt" )) == NULL ){
    sprintf( buf, "%s\n\nThe name file is not found.",
            szFile.c_str() );
    cout << buf << endl;
    return( false );
}
else{
    for( row=0; fgets( buf, BFSZ, fp );row++){
        if( row == 0 ) continue;
        p = strtok( buf, " \n\t" );
        if( p == NULL ) continue;
        tmpTime = atof( p );
        p = strtok( NULL, " \n\t" );
        if( p == NULL ) continue;
        tmpAllTime = tmpTime;
    }
    fclose(fp);
}

//-----
// If current pattern file exists
//-----
if( setCalculateData.empty() != true ){
    setCalculateData.erase( setCalculateData.begin(),
                            setCalculateData.end() );
    setCalculateData.clear();
}

//-----
// Create pattern file null data.
//-----
memset( &tmpCalculateData, 0x00, sizeof( tmpCalculateData ));
for( tmpSetTime = 0.0; tmpSetTime < tmpAllTime;
    tmpSetTime = tmpSetTime + m_fUnitTime ){
time.
    tmpCalculateData.fTimes = tmpSetTime *10;
    tmpCalculateData.nWriteFlg = 1;
    setCalculateData.insert(pair<double, stCalculateData>
                            (tmpCalculateData.fTimes, tmpCalculateData) );
}

//-----
// Pattern file read processing Step
// (Set in analysis data file)
//-----
if((fp = fopen( szFile.c_str(), "rt" )) == NULL ){
    sprintf( buf, "%s\n\nThe name file is not found.",
            szFile.c_str() );
    cout << buf << endl;
}

```

```

// If file open failed
// Sets error message.
// Ends with error.
// If normally opened

// If data has no vehicle speed and time

// If data has no vehicle speed and time
// Sets accumulated seconds.

// If analysis data exists
// Deletes existing analysis data
// -----

// Initializes temporary analysis data
// Sets data for analysis interval according to accumulated
// Sets accumulated time in msec.
// Analysis write ON
// Sets analysis time in pattern information

// If file open failed
// Sets error message.

```



```

        nGear = 0;
    }
} else{
    tmpCalculateData.nGear = nGear;
}

//-----
// Set pattern file data as analysis data
//-----
p_setCalculateData = setCalculateData.find( tmpCalculateData.fTimes );
if( p_setCalculateData != setCalculateData.end() ){
    tmpCalculateData.nWriteFlg = 1;
    setCalculateData.erase( p_setCalculateData );
    setCalculateData.insert(pair<double, stCalculateData>
        (tmpCalculateData.fTimes, tmpCalculateData) );
} else{
    tmpCalculateData.nWriteFlg = 1;
    setCalculateData.insert(pair<double, stCalculateData>
        (tmpCalculateData.fTimes, tmpCalculateData) );
}

//-----
// Fill with data up to next gear in case of gear description mode.
//-----
mode
if( tmpTime - tmpBefTime != m_fUnitTime ){
    p_setEnd = setCalculateData.find( tmpCalculateData.fTimes );
    tmpCalculateData.fTimes = tmpTime *10;
    p_setStart = setCalculateData.find( tmpBefTime );
    for( p_setCalculateData = p_setStart;
        p_setCalculateData != p_setEnd; p_setCalculateData++ ){
        p_setCalculateData->second.nGear = nGear;
    }
    tmpAllTime = tmpTime;
    tmpBefTime = tmpTime;
}
fclose(fp);

BtwnTimeSet( setCalculateData.begin(), setCalculateData.end() );

return( true );
}
/**/
/*****
* Function name      : GetMaxNe
* Function summary   : Max. engine speed acquisition processing
* Explanation        : Rated output engine speed is obtained and set.
*                    :
* Argument (input)   : None
*****/

```



```

* Argument (output)      : None
* Argument (I/O)        : None
* Return value          : double   Rated output engine speed
* Created by            :
* Updated on (created on) :
* Remarks               :
*****/
double   TCalculateProc::GetMaxNe ()
{
    double fMaxNe;                               // Max. engine speed

    // Rated output engine speed
    fMaxNe = (int)m_fRatedOutputRotation;        // Sets rated output engine speed.
    return( fMaxNe );
}
/**/
/*****
* Function name          : GetKG
* Function summary       : Gravitational acceleration acquisition processing
* Explanation            : Gravitational acceleration is obtained and set.
*
* Argument (input)       : None
* Argument (output)      : None
* Argument (I/O)         : fKg : Gravitational acceleration
* Return value           : true : Normal   false : Failure
* Created by             :
* Updated on (created on) :
* Remarks                :
*****/
bool   TCalculateProc::GetKG(double &fKg)
{
    fKg = m_fKg;                               // Sets gravitational acceleration.
    return(true);
}
/**/
/*****
* Function name          : GetExceedF
* Function summary       : Data setup processing for excess force ratio
* Explanation            : Force ratio data is set.
*
* Argument (input)       : None
* Argument (output)      : None
* Argument (I/O)         : None
* Return value           : true : Normal   false : Failure
* Created by             :
* Updated on (created on) :
* Remarks                :
*****/
bool   TCalculateProc::GetExceedF(void)

```

```

{
    stExceedForce tmpExceedForce; // Temporary excess force ratio data
    int nRet; // Function return value
    int i;
    string tmpStr;
    double fGearti;
    string szKey, szData;

    // Existing excess force ratio data is provided.
    if( m_ExceedForce.empty() != true ){ // If data already exists
        m_ExceedForce.erase( m_ExceedForce.begin(), // Deletes existing data.
            m_ExceedForce.end() );
        m_ExceedForce.clear();
    }

    for( i = 1; i <= m_nMaxGear; i++ ){ // Initializes temporary data.
        memset( &tmpExceedForce, 0x00, sizeof( tmpExceedForce ) );

        tmpExceedForce.nGear = i; // Gear position

        // Gear position
        nRet = GetGearHi( tmpExceedForce.nGear, fGearti );
        if( nRet != OK ){
            return( false );
        }
        tmpExceedForce.fGearti = fGearti; // Gear ratio
        // Transmission efficiency
        tmpExceedForce.fForcePer = GetGearPass( i ); // Sets gear transmission efficiency.

        // Set excess torque ratio and normalized engine speed based on gear value.
        if( i <= 2 ){ // If gear position is 2-speed or less
            if( m_fCarMaxW + m_fCarIniW + ( m_fPersonW * m_fPersons ) >= // GVW (empty vehicle mass + max. payload) of 8t or more
                DEF_FORCEOVER ){ // Excess torque ratio 2.0
                tmpExceedForce.fFreePer = DEF_FORCE_OV_GEAR2;
            } else { // Excess torque ratio 2.4
                tmpExceedForce.fFreePer = DEF_FORCE_UN_GEAR2;
            }
            tmpExceedForce.fMinPer = DEF_FORCE_NE_GEAR2; // Lower-limit engine speed (normalized engine speed) 5%
        } // If gear position is 3-speed
        else if( i == 3 ){ // GVW (empty vehicle mass + max. payload) of 8t or more
            if( m_fCarMaxW + m_fCarIniW + ( m_fPersonW * m_fPersons ) >= // Excess torque ratio 1.7
                DEF_FORCEOVER ){ // Excess torque ratio 1.7
                tmpExceedForce.fFreePer = DEF_FORCE_OV_GEAR3;
            } else { // Excess torque ratio 1.7
                tmpExceedForce.fFreePer = DEF_FORCE_UN_GEAR3;
            }
            tmpExceedForce.fMinPer = DEF_FORCE_NE_GEAR3; // Lower-limit engine speed (normalized engine speed) 11%
        } // If gear position is 4-speed
        else if( i == 4 ){ // GVW (empty vehicle mass + max. payload) of 8t or more
            if( m_fCarMaxW + m_fCarIniW + ( m_fPersonW * m_fPersons ) >= // Excess torque ratio 1.3
                DEF_FORCEOVER ){ // Excess torque ratio 1.3
                tmpExceedForce.fFreePer = DEF_FORCE_OV_GEAR4;
            } else {

```

```

        tmpExceedForce.fFreePer = DEF_FORCE_UN_GEAR4; // Excess torque ratio 1.6
    }
    tmpExceedForce.fMinPer = DEF_FORCE_NE_GEAR4; // Lower-limit engine speed (normalized engine speed) 19%
} else { // If gear position is 5-speed or more
    if( m_fCarMaxW + m_fCarIniW + (m_fPersonW * m_fPersons) >=
        DEF_FORCEOVER ) { // GVW (empty vehicle mass + max. payload) of 8t or more
        tmpExceedForce.fFreePer = DEF_FORCE_OV_GEAR4; // Excess torque ratio 1.3
    } else {
        tmpExceedForce.fFreePer = DEF_FORCE_UN_GEAR4; // Excess torque ratio 1.6
    }
    tmpExceedForce.fMinPer = DEF_FORCE_NE_GEAR5; // Lower-limit engine speed (normalized engine speed) 26%
}

    tmpExceedForce.fMinNe = ( m_fFixedNe - m_fIdleNe ) *
        tmpExceedForce.fMinPer/100.0 + m_fIdleNe; // Calculates lower-limit engine speed.
    m_ExceedForce.insert( tmpExceedForce ); // Sets excess force ratio data.
}

return( true );
}
/**/
/*****
* Function name : GetGearPass
* Function summary : Gear transmission efficiency setup processing
* Explanation : Gear transmission efficiency is set.
*
* Argument (input) : nGear : Gear position
* Argument (output) : None
* Argument (I/O) : None
* Return value : double Transmission efficiency
* Created by :
* Updated on (created on) :
* Remarks :
*****/
double TCalculateProc::GetGearPass( int nGear )
{
    if( m_fGearHi.empty() == true ){
        return( 0 );
    }
    if( nGear > (int)(m_fGearHi.size()) ){
        return( 1 );
    }
    // -----
    // Set transmission efficiency based on gear ratio.
    // -----
    if( m_fGearHi[nGear-1] == 1 ){ // If gear ratio is 1:0.
        return( DEF_FORCE_ON98 );
    } else {
        return( DEF_FORCE_OFF95 );
    }
}

```

```

}
/**/
/*****
* Function name      : ReadMaxTorqueData
* Function summary   : Max. torque data setup processing
* Explanation        : Data is read from max. torque data file.
*
* Argument (input)   : FileName : Max. torque data file name
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : OK : Normal   NG : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
int TCalculateProc::ReadMaxTorqueData(string FileName) // Obtains max. torque data.
{
    MAX_TORQUE tmpMaxTorque; // Temporary max. torque data
    long row;
    string szTmp;
    double fData;
    char buf[100];
    FILE *fp;
    CCsvFile *pStringList; // Template

    // -----
    // Rated torque
    // -----
    m_fRatedTorque = 0; // Sets rated torque data in internal data.

    // -----
    // Max. torque data file open processing
    // -----
    if( ( fp = fopen( FileName.c_str(), "rt" ) ) == NULL ){ // If no applicable file exists
        sprintf( buf, "%s\n\nThe file is not found.", // Generates dialog message.
                FileName.c_str() );
        cout << buf << endl;
        return( NG ); // Ends with error
    }

    // -----
    // Deletes existing data if any.
    // -----
    if (m_MaxTorque.empty() != true){ // If data exists
        m_MaxTorque.erase( m_MaxTorque.begin(), // Deletes existing data.
                           m_MaxTorque.end() );
        m_MaxTorque.clear(); // -----
    }

    pStringList = new CCsvFile(); // Generates template.
}

```

```

// -----
// Read file and store internal data.
// -----
for( row = 0; fgets( buf, sizeof(buf), fp ); row ++){
// -----
// Skip comment section.
// -----
if (row < 1 ) continue; // Does not process comment section.

// -----
// Process read data based on tab delimiting.
// -----
pStringList->DeleteData();
pStringList->SetDataStr( string(buf) ); // Stores read data.
pStringList->SetAtRec(1);
// -----
// Max. torque data exists?
// -----
if( pStringList->GetDataCnt() == 2 ){ // If column data count is 2
CommFun->AStrToDouble(pStringList->Strings(0), fData); // Converts character string to real number.
tmpMaxTorque.fEgrevo = fData; // Sets engine speed.

CommFun->AStrToDouble(pStringList->Strings(1), fData); // Converts character string to real number.
tmpMaxTorque.fEgtq = fData; // Sets engine torque.
// -----
// Store max. torque data in internal area.
// -----
m_MaxTorque.insert( tmpMaxTorque ); // Stores max. torque data in internal data.
// -----
// Rated torque determination
// -----
if( fData > m_fRatedTorque ){ // Max. torque data?
m_fRatedTorque = fData; // Sets rated torque data in internal data.
}
}
}
delete pStringList; // Deletes template.

fclose(fp);
return( OK );
}
/**/
/*****
* Function name : GetLineReviseMaxTorque
* Function summary : Max. torque data interpolation processing
* Explanation : Obtain max. torque data, and execute calculation. (Linear interpolation)
* :
* Argument (input) : fNe : Engine speed
* Argument (output) : None
* Argument (I/O) : None
* Return value : double Torque
*****/

```

```

* Created by      :
* Updated on (created on) :
* Remarks        :
*****/
double TCalculateProc::GetLineReviseMaxTorque(double fNe)
{
    double fNeA, fNeB, fTorqueA, fTorqueB, fMaxTorque;
    set<MAX_TORQUE>::iterator p_nextMaxTorque; // Pointer
    MAX_TORQUE tmpMaxTorque; // Temporary max. torque data

    // Check max. torque data within data range if it exists.
    if (m_MaxTorque.empty() != true) {
    } else {
        // Return NG if max. torque data does not exist.
        return( 0.0 );
    }

    // Find appropriate engine speed and max. loss torque data from array.
    memset( &tmpMaxTorque, 0x00, sizeof( tmpMaxTorque ) );
    tmpMaxTorque.fEgrevo = fNe;
    p_MaxTorque = m_MaxTorque.lower_bound( tmpMaxTorque );

    // Return NG if not found.
    if ( p_MaxTorque == m_MaxTorque.end() ) {
        p_MaxTorque = m_MaxTorque.end();
        p_MaxTorque--;
        fNeB = p_MaxTorque->fEgrevo;
        fTorqueB = p_MaxTorque->fEgtq;
        p_MaxTorque--;
        fTorqueA = p_MaxTorque->fEgtq;
        fNeA = p_MaxTorque->fEgrevo;
        // Prevent dividing by 0.
        if ((fNeB - fNeA) == 0) return( 0.0 );
        // Obtain appropriate max. torque by linear interpolation (polygonal line).
        fMaxTorque = fTorqueB +
            (fTorqueB - fTorqueA) /
            (fNeB - fNeA) *
            (fNe - fNeB);
        return( fMaxTorque );
    }

    fNeB = p_MaxTorque->fEgrevo;
    fTorqueB = p_MaxTorque->fEgtq;
    // Obtain preceding data.
    if ( p_MaxTorque != m_MaxTorque.begin() ) {
        p_MaxTorque--;
        fTorqueA = p_MaxTorque->fEgtq;
        fNeA = p_MaxTorque->fEgrevo;
    } else {
        fTorqueA = p_MaxTorque->fEgtq; // Next data if first data.
    }
}

```

```

    fNeA = p_MaxTorque->fEgrevo;
    p_MaxTorque++;
    fNeB = p_MaxTorque->fEgrevo;
    fTorqueB = p_MaxTorque->fEgtq;
}

// Prevent dividing by 0.
if ((fNeB - fNeA) == 0) return( 0.0 );

// Obtain appropriate max. torque by linear interpolation (polygonal line).
fMaxTorque = fTorqueA +
    (fTorqueB - fTorqueA) /
    (fNeB - fNeA) *
    (fNe - fNeA);

return( fMaxTorque );
}
/**/
/*****
* Function name      : CalcForceWithNeSet
* Function summary   : Driving force setup confirmation processing
* Explanation        : Driving force is calculated. Also, shift-up availability is determined.
*                    :
* Argument (input)   : nGear : Gear position to be used
* Argument (input)   : fTe  : Required rotation torque
* Argument (input)   : fNe  : Engine speed
* Argument (output)  : fF   : Required force ratio
* Argument (I/O)     : None
* Return value       : true  : shift up OK      false : shift up NG
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::CalcForceWithNeSet(int nGear, double fTe,
                                       double fNe, double &fF )
{
    stExceedForce tmpExceedForce;
    double fGtn;
    double fFper;
    double fMaxTe;
    bool bRet;

    // Data for excess force ratio
    // Speed change gear ratio
    // Power transmission efficiency
    // Max. torque
    // Max. force ratio/required force ratio

    if( nGear != 0 ){
        memset( &tmpExceedForce, 0x00, sizeof( tmpExceedForce ) );
        tmpExceedForce.nGear = nGear;
        p_ExceedForce = m_ExceedForce.find( tmpExceedForce );
        fGtn = p_ExceedForce->fGearti;
        fFper = p_ExceedForce->fForcePer;

        // If gear position is set
        // Initializes search data.
        // Sets gear position for search target.
        // Obtains applicable gear position.
        // Obtains gear ratio.
        // Sets power transmission efficiency.

        if(( fTe != 0.0 )&&( fGtn != 0.0 )&&( fFper != 0.0 )){
            fF = fTe * fGtn * fFper / ( 1000.0 * m_fTarR );

            // Sets driving force.
        }
    }
}

```

```

    }
}

// Obtain max. torque.
fMaxTe = GetLineReviseMaxTorque(fNe);
if( p_ExceedForce->fFreePer < fMaxTe / fTe ){
    bRet = true; // shift up OK.
}else{
    bRet = false; // shift up NG.
}

return(bRet);
}
/**/
/*****
* Function name      : CheckForce
* Function summary   : Driving force calculation processing
* Explanation        : Driving force is calculated. Shift-up availability is determined.
*                    :
* Argument (input)   : nGear : Gear position to be used
* Argument (input)   : fVana : Analysis speed
* Argument (input)   : fCarA : Acceleration
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : shift up OK      false : shift up NG
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::CheckForce(int nGear, double fVana, double fCarA )
{
    double fTe; // Required rotation torque
    double fNe; // Number of engine speed
    double fF; // Driving force
    int nRet; // Function return value
    bool bRet; // Function return value

    nRet = GetNe( nGear, fVana, fNe); // Engine speed
    if( nRet == NG ){
        return( false );
    }
    nRet = GetTe( nGear, fVana, fCarA, fNe, fTe); // Engine torque
    if( nRet == NG ){
        return( false );
    }

    bRet = CalcForceWithNeSet( nGear, fTe, fNe, fF ); // Determines shift-up availability based on torque.
    return( bRet );
}
/**/

```



ConvertD\_pub.cpp

```

/*****
* Function name      : CalcTeMaxSp
* Function summary   : Target-speed follow calculation processing
* Explanation        : When speed changes from A to B,
*                   : speed fV is calculated if target-speed follow is impossible in time fTm.
* Argument (input)  : nGear : Gear position to be used
* Argument (input)  : fVbef : Previous speed
* Argument (input)  : fTm   : Usage time
* Argument (output) : fNe   : engine speed
* Argument (I/O)    : double fV : Speed for this time/speed after re-calculation
* Return value      : true  : Converged   false : Not converged
* Created by        :
* Updated on (created on) :
* Remarks           :
*****/
bool TCalculateProc::CalcTeMaxSp(int nGear, double fTm, double fVbef, double &fV, double &fNe )
{
    double fV_def; // Vehicle speed before change
    double fV1; // Calculation base point speed 1
    double fV2; // Calculation base point speed 2
    double fV_cal1; // Calculation point intermediate-1
    double fV_calM; // Calculation point intermediate
    double fV_cal2; // Calculation point intermediate+1
    double fTe_DIF_1; // Torque ratio of calculation point intermediate-1
    double fTe_DIF_M; // Torque ratio of calculation point intermediate
    double fTe_DIF_2; // Torque ratio of calculation point intermediate+1
    double fNe_def; // Engine speed for this time (no correction)
    double fNe_cal; // Engine speed for this time (after calculation)
    double fTe_def; // Torque for this time (no correction)
    double fTe_sp; // Torque for this time (corrected)
    double fTe_cal; // Torque for this time (after calculation)
    double fCarA; // Acceleration
    int nRet; // Function return value
    int i;

    fV_def = fV; // Stores vehicle speed before setting.

    // Calculate acceleration, torque, and engine speed for this time.
    nRet = GetNe( nGear, fV, fNe_def); // Engine speed
    if( nRet == NG ){
        return( false );
    }

    if( fNe_def >= m_fOutputRotation ){
        fNe_def = m_fOutputRotation;
        nRet = GetV( nGear, fNe_def, fV );
        if( nRet == NG ){
            return( false );
        }
        fV_def = fV;
    }
}

```

```

fNe = fNe_def;
fCarA = (( fV - fVbef) / fTm) * 1000.0/(60.0*60.0); // Calculates acceleration.
if( fCarA <= 0 ){
    return( true );
}
nRet = GetTe_NotRevise( nGear, fV, fCarA, fNe_def, fTe_def); // Engine torque (without complement)
if( nRet == NG ){
    return( false );
}
fTe_spl = GetLineReviseMaxTorque(fNe_def);

if( fTe_spl < fTe_def ){ // If spline-complemented torque is
                        // Engine speed
    nRet = GetNe( nGear, fV, fNe_def);
    if( nRet == NG ){
        return( false );
    }
    if( fNe_def < m_fClutch_MeetNe ){
        fNe_def = m_fClutch_MeetNe;
    }
    nRet = GetTe_NotRevise( nGear, fV, fCarA, fNe_def, fTe_def); // Engine torque (without complement)
    if( nRet == NG ){
        return( false );
    }
}

fTe_cal = fTe_def; // smaller than calculated torque
fNe_cal = fNe_def; // Torque to be calculated
fV1 = fVbef; // Engine speed to be calculated
fV2 = fV_def;
for( i=0; i<10000; i++){ // Finds approximate TeMax=Te and acceleration.
    if( fTe_spl != 0 ){
        if(( 0 <= ( fTe_spl - fTe_cal) )&&
            ( ( fTe_spl - fTe_cal ) < 1.0E-6 )){ // If nearest value is found
            break;
        }
    }
}

// -----
// Calculate intermediate speed.
// -----
fV = fV1 + (fV2 - fV1)/2.0; // Determines mid-point speed.
fV_calM = fV;
// Calculate intermediate acceleration and torque (with/without correction).
fCarA = (( fV - fVbef) / fTm) * 1000.0/(60.0*60.0); // Calculates acceleration.
// Calculate mid-point engine speed.
nRet = GetNe( nGear, fV, fNe_cal); // Engine speed
if( nRet == NG ){
    return( false );
}
}

```

```

if( fNe_cal < m_fClutch_MeetNe ){
    fNe_cal = m_fClutch_MeetNe;
}
if( fNe_cal >= m_fOutputRotation ){
    fNe_cal = m_fOutputRotation;
    nRet = GetV( nGear, fNe_cal, fV );
    if( nRet == NG ){
        return( false );
    }
    fV_calM = fV;
    fCarA = (( fV - fVbef) / fTm) * 1000.0/(60.0*60.0);
}
fNe = fNe_cal;
nRet = GetTe_NotRevise( nGear, fV, fCarA, fNe_cal, fTe_cal); // Engine torque (without complement)
if( nRet == NG ){
    return( false );
}
fTeSpl = GetLineReviseMaxTorque(fNe_cal); // Linear interpolation

if( fTeSpl != 0 ){
    if(( 0 <= ( fTeSpl - fTe_cal) )&&
        ( ( fTeSpl - fTe_cal ) < 1.0E-6 )){ // If nearest value is found
        break;
    }
    fTe_DIF_M = (fTe_cal / fTeSpl );
} else{
    fTe_DIF_M = 0;
}

// -----
// Calculate speed faster than mid-point speed.
// -----
fV = fV1 + (fV2 - fV1)/2.0 + (fV2 - fV1)/ 4.0;
fV_cal2 = fV;
// Calculate acceleration and torque (with/without correction). // Calculates acceleration.
fCarA = (( fV - fVbef) / fTm)* 1000.0/(60.0*60.0);

// Calculate engine speed. // Engine speed
nRet = GetNe( nGear, fV, fNe_cal);
if( nRet == NG ){
    return( false );
}
if( fNe_cal < m_fClutch_MeetNe ){
    fNe_cal = m_fClutch_MeetNe;
}
if( fNe_cal >= m_fOutputRotation ){
    fNe_cal = m_fOutputRotation;
    nRet = GetV( nGear, fNe_cal, fV );
    if( nRet == NG ){
        return( false );
    }
}

```

```

    fV_cal2 = fV;
    fCarA = (( fV - fVbef) / fTm) * 1000.0/(60.0*60.0);
}
fNe = fNe_cal;
nRet = GetTe_NotRevise( nGear, fV, fCarA, fNe_cal, fTe_cal); // Engine torque (without complement)
if( nRet == NG ){
    return( false );
}
fTe_spl = GetLineReviseMaxTorque(fNe_cal); // Linear interpolation

if( fTe_spl != 0 ){
    if(( 0 <= ( fTe_spl - fTe_cal) )&&
        ( ( fTe_spl - fTe_cal ) < 1.0E-6 )){ // If nearest value is found
        break;
    }
    fTe_DIF_2 = (fTe_cal / fTe_spl );
} else{
    fTe_DIF_2 = 0;
}

// -----
// Calculate speed slower than mid-point speed.
// -----
fV = fV1 + (fV2 - fV1)/2.0 - (fV2 - fV1)/ 4.0;
fV_cal1 = fV;
// Calculate acceleration and torque (with/without correction).
fCarA = (( fV - fVbef) / fTm) * 1000.0/(60.0*60.0); // Calculates acceleration.

// Calculate engine speed.
nRet = GetNe( nGear, fV, fNe_cal); // Engine speed
if( nRet == NG ){
    return( false );
}
if( fNe_cal < m_fClutch_MeetNe ){
    fNe_cal = m_fClutch_MeetNe;
}
if( fNe_cal >= m_fOutputRotation ){
    fNe_cal = m_fOutputRotation;
    nRet = GetV( nGear, fNe_cal, fV );
    if( nRet == NG ){
        return( false );
    }
}
fV_cal1 = fV;
fCarA = (( fV - fVbef) / fTm) * 1000.0/(60.0*60.0);
}
fNe = fNe_cal;
nRet = GetTe_NotRevise( nGear, fV, fCarA, fNe_cal, fTe_cal); // Engine torque (without complement)
if( nRet == NG ){
    return( false );
}
fTe_spl = GetLineReviseMaxTorque(fNe_cal); // Linear interpolation

```

```

if( fTe_spl != 0 ){
    if(( 0 <= ( fTe_spl - fTe_cal ) )&&
        ( ( fTe_spl - fTe_cal ) < 1.0E-6 )){
        break; // If nearest value is found
    }
    fTe_DIF_1 = (fTe_cal / fTe_spl );
} else{
    fTe_DIF_1 = 0;
}

// Since not found, reduce the speed range
// and restart calculation.

// Check that cross point is generated at more than one location.
if( ( fTe_DIF_1 < 1.0 )&&( fTe_DIF_2 < 1.0 )&&( fTe_DIF_M > 1.0 ) ){
    return(false);
}

// First, determination is made for mid-point.
if( fTe_DIF_M > 1.0 ){ // If mid-point is still in Te > TeMax
    if( ( 1.0 < fTe_DIF_1 )&&
        ( fTe_DIF_1 < fTe_DIF_M )&&
        ( fTe_DIF_M < fTe_DIF_2 )){ // If Te1 is near cross point
        // -----
        // If Te1 is near cross point
        // -----
        fV2 = fV_cal1; // Sets range end to Te1 speed.
    } else if( ( fTe_DIF_1 < 1.0 )&&
        ( 1.0 < fTe_DIF_M )&&
        ( fTe_DIF_M < fTe_DIF_2 ) ){ // If cross point is between Te1 and TeM.
        // -----
        // If cross point is between Te1 and TeM
        // -----
        fV1 = fV_cal1; // Sets range start point to Te1 speed.
        fV2 = fV_calM; // Sets range end to TeM speed.
    } else if( ( fTe_DIF_1 > fTe_DIF_M )&&
        ( fTe_DIF_M > 1.0 )&&
        ( 1.0 > fTe_DIF_2 )){ // Cross point is between TeM and Te2.
        // -----
        // If cross point is between TeM and Te2
        // -----
        fV1 = fV_calM; // Sets range start point to TeM speed.
        fV2 = fV_cal2; // Sets range end to Te2 speed.
    } else if( ( fTe_DIF_1 > fTe_DIF_M )&&
        ( fTe_DIF_M > fTe_DIF_2 )&&
        ( fTe_DIF_2 > 1.0 )){ // If cross point is near Te2
        // -----
        // If cross point is near Te2

```



```

    }
    if( fTe_DIF_1 == fTe_DIF_M ){
        fV2 = fV_calM;
    }else if( fTe_DIF_M == fTe_DIF_2 ){
        fV1 = fV_calM;
    }else{
        return(true);
    }
}
}
}
if( i >= 10000 ){
    return( false );
}
}
return( true );
}
/**/
/*****
* Function name      : BtwnTimeSet
* Function summary   : Section time setup processing
* Explanation        : Time is set for specified section.
*
* Argument (input)   : p_first : First pointer
* Argument (input)   : p_end   : Final pointer
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       :
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
void TCalculateProc::BtwnTimeSet(map<double, stCalculateData>::iterator p_first,
                                map<double, stCalculateData>::iterator p_end )
{
    map<double, stCalculateData>::iterator p_tmp;
    map<double, stCalculateData>::iterator p_next; // Next pointer
    // -----
    // Set section time for analysis data.
    // -----
    for( p_tmp = p_first; p_tmp != p_end; p_tmp++ ){ // Loops for number of analysis data items.
        p_next = p_tmp; p_next++; // Sets next pointer.
        if( p_next != setCalculateData.end() ){ // Sets next pointer for other than final data.
            p_tmp->second.nCalcTime = (int)(p_next->second.fTimes - p_tmp->second.fTimes); // Sets section using accumulated time.
        }
    }
    return;
}
/**/

```

```

/*****
* Function name      : BtwnCarASet
* Function summary   : Section acceleration setup processing
* Explanation        : Speed is set for specified section.
*
* Argument (input)   : p_first : First pointer
* Argument (input)   : p_end   : Final pointer
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       :
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
void TCalculateProc::BtwnCarASet(map<double, stCalculateData>::iterator p_first,
                                map<double, stCalculateData>::iterator p_end )
{
    map<double, stCalculateData>::iterator p_tmp;
    map<double, stCalculateData>::iterator p_next;
    double fVx1, fVx2;
    double fTx1, fTx2;
    double fCarA;

    // -----
    // Set acceleration in previous data.
    // -----
    if( p_first != setCalculateData.begin() ){
        p_first--;
        p_end--;
    }
    // -----
    // Set section time for analysis data.
    // -----
    for( p_tmp = p_first; p_tmp != p_end; p_tmp++ ){
        p_next = p_tmp; p_next++;
        if( p_next != setCalculateData.end() ){
            fVx1 = p_tmp->second.fVana_sp;
            fTx1 = p_tmp->second.fTimes /10.0;
            fVx2 = p_next->second.fVana_sp;
            fTx2 = p_next->second.fTimes /10.0;
            if(( fVx2 - fVx1 == 0 ) || ( fTx2 - fTx1 == 0 )){
                fCarA = 0;
            }else{
                fCarA = ( fVx2 - fVx1 ) / ( fTx2 - fTx1 );
            }

            // Acceleration setting
            p_tmp->second.fA = fCarA;
            p_tmp->second.fCarA = fCarA * 1000.0 / (60.0*60.0);
        }
    }
}

```

// Next pointer  
// Temporary reference vehicle speed  
// Temporary accumulated time  
// Temporary acceleration  
  
// Loops for number of analysis data items.  
// Sets next pointer.  
// Sets next pointer for other than final data.  
// Sets first speed.  
// Sets first time.  
// Sets next point speed.  
// Sets next point time.  
// If time is 0 or speed not changed  
// Sets acceleration to 0.  
  
// Calculates acceleration.  
  
// Sets acceleration.  
// \_\_\_\_\_ km/sec -> m/msec



```

    return;
}
/**/
/*****
* Function name      : Calculate_progress1
* Function summary   : Reference speed/reference acceleration setup processing
* Explanation        : Reference speed and acceleration are calculated and set.
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_progress1()
{
    map<double, stCalculateData>::iterator p_first; // First data
    map<double, stCalculateData>::iterator p_second; // Next data
    double tmpfTimes; // Temporary accumulated time
    double fVx1, fVx2; // Temporary reference vehicle speed
    double fTx1, fTx2; // Temporary accumulated time
    double fCarA; // Temporary acceleration
    double tmpfV; // Temporary reference vehicle speed (first position)
    bool tmpbIdle; // Temporary IDLE state

    // -----
    // End as is if no analysis data exists.
    // -----
    if( setCalculateData.empty() == true ){ // If no analysis data exists
        return( true );
    }
    // -----
    // Obtain data from vehicle speed in analysis data
    // till next vehicle speed.
    // -----
    tmpfTimes = 0.0; // Sets temporary accumulated time.
    p_first = setCalculateData.end(); // Initializes reference position.
    p_second = setCalculateData.end(); // Initializes next position.
    for( p_setCalculateData = setCalculateData.begin();
        p_setCalculateData != setCalculateData.end();
        p_setCalculateData++ ){ // Loops for number of analysis data items.
        if(( p_setCalculateData->second.fV == 0 )&&
            ( p_setCalculateData->second.nPtnReadFlg == 0 )){ // If read vehicle speed does not exist and pattern read data
            does not exist
            if(( p_first != setCalculateData.end() )&&
                ( p_second == setCalculateData.end() )){ // If first point is recognized but next point is not found
                p_setCalculateData->second.fbtwnTime =
                    (double)( p_setCalculateData->second.fTimes / 10.0 ) -
                    (double)tmpfTimes; // Sets elapsed time from first point.
            }
        }
    }
}

```

```

    }
    continue;
}

if( p_first == setCalculateData.end() ){
    p_first = p_setCalculateData;
    tmpfTimes = p_setCalculateData->second.fTimes /10.0;
    p_setCalculateData->second.fbtwnTime = 0;
    continue;
}

if( p_second == setCalculateData.end() ){
    p_second = p_setCalculateData;
}

// -----
// Calculate acceleration.
// -----
fVx1 = p_first->second.fV;
fTx1 = p_first->second.fTimes /10.0;
fVx2 = p_second->second.fV;
fTx2 = p_second->second.fTimes /10.0;
if(( fVx2 - fVx1 == 0 ) || ( fTx2 - fTx1 == 0 )){
    fCarA = 0;
} else{
    fCarA = ( fVx2 - fVx1 ) / ( fTx2 - fTx1 );
}
tmpfV = p_first->second.fV;
tmpbldle = p_first->second.bldle;
// -----
// Calculate reference speed and reference acceleration.
// -----
for( p_setCalculateData = p_first;
    p_setCalculateData != p_second;
    p_setCalculateData++ ){
    // Acceleration setting
    p_setCalculateData->second.fA = fCarA;
    p_setCalculateData->second.fCarA = fCarA * 1000.0 / (60.0 * 60.0);
    // Reference vehicle speed setting
    p_setCalculateData->second.fVref_sp =
        tmpfV + fCarA * p_setCalculateData->second.fbtwnTime;
    p_setCalculateData->second.bldle = tmpbldle;
}

p_first = p_second;
p_second = setCalculateData.end();
tmpfTimes = p_first->second.fTimes /10.0;
p_setCalculateData->second.fbtwnTime = 0;
}

return( true );

```

```

// If first point is not set
// Sets pointer as first position.
// Sets elapsed time as temporary accumulated time.
// Sets elapsed time from first point as 0.

```

```

// If next point is not set
// Sets pointer as next position.

```

```

// Sets first speed.
// Sets first time.
// Sets next point speed.
// Sets next point time.
// If time is 0 or speed not changed
// Sets acceleration to 0.

```

```

// Calculates acceleration.

```

```

// Sets first speed as temporary speed.
// Sets temporary IDLE state.

```

```

// Loops from first to next positions.

```

```

// Sets acceleration.
// _____ km/sec -> m/msec

```

```

// Calculates reference vehicle speed.
// Sets temporary IDLE state.

```

```

// Sets next point as first position.
// Sets next point as end position.
// Sets elapsed time as temporary accumulated time.
// Sets elapsed time from first point as 0.

```

```

}
/**/
/*****
* Function name      : Calculate_progress2
* Function summary   : Processing flag setup processing
* Explanation       : Processing methods are classified based on speed and acceleration.
*
* Argument (input)  : None
* Argument (output) : None
* Argument (I/O)    : None
* Return value      : true : Normal   false : Failure
* Created by        :
* Updated on (created on) :
* Remarks           :
*****/
bool TCalculateProc::Calculate_progress2()
{
    map<double, stCalculateData>::iterator p_before;           // Previous pointer
    int nBefFlag;                                           // Previous flag
    int nGear;                                             // Previous gear position
    double fBef_V;                                         // Previous speed

    nBefFlag = 0;                                           // Initializes preceding flag.
    nGear = 0;
    fBef_V = 0;

    for( p_setCalculateData = setCalculateData.begin();
        p_setCalculateData != setCalculateData.end();
        p_setCalculateData++ ) {
        if( p_setCalculateData->second.fVref_sp == fBef_V ) { // Executed for all analysis data items
            if( nBefFlag == 0 ) { // If previous speed is same
                p_setCalculateData->second.nFlag = 0; // If previous operation is IDLE state.
            } else { // Operation for this time is also IDLE state.
                p_setCalculateData->second.nFlag = 5; // If other than IDLE state
            } // Operation for this time is acceleration processing.
        } else if( p_setCalculateData->second.fVref_sp > fBef_V ) { // If faster than previous speed
            if( p_setCalculateData == setCalculateData.begin() ) { // In case of first data
                p_setCalculateData->second.nFlag = 2; // Executes constant speed processing.
            } else if( nBefFlag == 0 ) { // If previous operation is IDLE state
                p_before->second.nFlag = 5; // Changes previous flag to Start as well.
                p_setCalculateData->second.nFlag = 5; // Operation for this time is acceleration state.
            } else { // Operation for this time is acceleration state.
                p_setCalculateData->second.nFlag = 5;
            }
        } else { // If slower than previous speed
            if( p_setCalculateData->second.fVref_sp == 0 ) { // If speed is 0
                p_setCalculateData->second.nFlag = 0; // Sets to IDLE state for this time.
            } else { // Sets to deceleration state for this time.
                p_setCalculateData->second.nFlag = 4;
            }
        }
    }
    nGear = p_setCalculateData->second.nGear; // Holds gear position for this time.
}

```

```

    nBefFlag = p_setCalculateData->second.nFlag;
    fBef_V = p_setCalculateData->second.fVref_sp;
    p_before = p_setCalculateData;
}
return( true );
}

/**/
/*****
* Function name      : Calculate_progress3
* Function summary   : Processing data setup processing
* Explanation        : According to each processing method, applicable module is initiated
*                   : and data is set.
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal    false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_progress3()
{
    map<double, stCalculateData>::iterator p_first; // First data
    map<double, stCalculateData>::iterator p_second; // Next data
    map<double, stCalculateData>::iterator p_betwn; // Identifies pointers before and after.
    bool bRet; // Function return value
    int tmpSize, tmpNow; // Percentage
    char buf[256];

    tmpSize = (int)setCalculateData.size(); // Sets size.
    tmpNow = 0;

    // -----
    // Make gear position settings for all analysis data items.
    // -----
    for( p_setCalculateData = setCalculateData.begin();
        p_setCalculateData != setCalculateData.end();
        p_setCalculateData++ ) { // Checks all analysis data items.

        // -----
        // Determine target range.
        // -----
        p_first = p_setCalculateData; // Sets first range position.
        for( p_second = p_first; p_second->second.nFlag == p_first->second.nFlag;
            p_second++ ) { // Up to same flag
            tmpNow++; // Increments count.
            if( p_second == setCalculateData.end() ) {
                break;
            }
        }
    }
}

```

```

    }
}

sprintf( buf, "%b%b%b%b%b%b%5.1f%%", (double)tmpNow / (double)tmpSize * 100.0 );
cout << buf;
if( tmpSize == tmpNow ) {
    cout << "%b%b%b%b%b%b ";
    cout << endl;
}

switch( p_setCalculateData->second.nFlag ) {
    case 0: // Sets gear according to pattern information flag.
            // In case of IDEL state
            // Sets IDLE state.
        bRet = Calculate_SetIDLE( p_first, p_second );
        if( bRet == false ) {
            return( false );
        }
        p_setCalculateData = p_second; // Sets IDLE state end position.
        p_setCalculateData--; // _____
        break;

    case 1: // Starting gear setting
            // Sets starting gear position.
        bRet = Calculate_Set_Start( p_first, p_second );
        if( bRet == false ) {
            return( false );
        }
        p_setCalculateData = p_second; // Increments count until vehicle start
        bRet = Calculate_Start_Following( p_setCalculateData ); // Post-processing for vehicle start
        if( bRet == false ) {
            return( false );
        }
        break;

    case 2: // Gear setting for constant speed running
            // Sets gear position for constant speed running.
        bRet = Calculate_Set_SteadyState( p_first, p_second );
        if( bRet == false ) {
            return( false );
        }
        p_setCalculateData = p_second; // Increments count until deceleration end.
        p_setCalculateData--; // _____
        break;

    case 3: // Gear setting for stop processing (clutch disengaged)
        break;

    case 4: // Gear setting for deceleration
            // Sets free-running time for deceleration.
        bRet = Calculate_T6Set( p_first, p_second );
        if( bRet == false ) {
            return( false );
        }
        bRet = Calculate_Set_Deceleration( p_first, p_second ); // Sets gear position for deceleration.
        if( bRet == false ) {
            return( false );
        }
        p_setCalculateData = p_second; // Increments count until deceleration end.
        p_setCalculateData--; // _____
}

```



```

    p_first->second.fNegrevo = fNegrevo; // Sets engine speed.
    p_first->second.fRL = fRL; // Sets load factor.
    p_first->second.fTe = fTe; // Sets engine torque.
    p_first->second.bIdle = true; // Sets IDLE state.
    p_first++; // Next position processing
}
return( true );
}
/**/
/*****
* Function name : Calculate_Set_Start
* Function summary : Starting section setup processing
* Explanation : Settings are made for starting section.
*
* Argument (input) : p_first : First pointer
* Argument (input) : p_second : Next setting pointer
* Argument (output) : None
* Argument (I/O) : None
* Return value : true : Normal false : Failure
* Created by :
* Updated on (created on) :
* Remarks :
*****/
bool TCalculateProc::Calculate_Set_Start( map<double, stCalculateData>::iterator p_first,
                                         map<double, stCalculateData>::iterator p_second )
{
    map<double, stCalculateData>::iterator p_before; // Data before section processing
    int befGear; // Previous gear position
    int befGearTime; // Previous gear determination time
    int nCount; // Counter

    double fCarA; // Acceleration
    double fVana_sp; // Analysis vehicle speed
    double fVref_sp; // Reference vehicle speed
    double fNegrevo; // Engine speed
    double fTe; // Engine torque
    double fRL; // R/L rolling resistance

    // -----
    // Initialization
    // -----
    fTe = 0.0;
    fRL = 0.0;

    p_before = p_first;
    if( p_before != setCalculateData.begin() ){ // If other than immediate execution of start processing
        p_before--; // Uses preceding data.
        befGearTime = p_before->second.nGearTime; // Previous gear setup time
    } else {

```

```

    befGearTime = 0;
}

// Use previous data.
if( p_before->second.nFlag != 0 ){
    fCarA = p_before->second.fCarA; // Previous acceleration
    fVana_sp = p_before->second.fVana_sp; // Previous analysis speed
    fVref_sp = p_before->second.fVref_sp; // Previous reference vehicle speed
    befGear = p_before->second.nGear;
} else {
    if( p_before != setCalculateData.begin() ){ // In case of immediate execution of starting
        fCarA = p_before->second.fCarA; // If other than immediate execution of start processing
        fVana_sp = p_before->second.fVana_sp; // Previous acceleration
        fVref_sp = p_before->second.fVref_sp; // Previous analysis speed
        befGear = p_before->second.nGear; // Previous reference vehicle speed
        // Previous gear position
    } else {
        fCarA = 0; // Acceleration = 0
        fVana_sp = 0; // Analysis speed = 0
        fVref_sp = 0; // Reference vehicle speed = 0
        befGear = 0; // Previous gear position = 0
    }
}

// -----
// Set IDLE engine speed as initial value.
// -----
fNegrevo = m_fIdleNe;
nCount = 0;
if( p_first != p_second ){
    while( p_first != p_second ){ // In case of other than first section
        if( p_first->second.nTimeFlg == 2 ){ // Loops according to range.
            fNegrevo = m_fIdleNe; // t2 section (time to reach starting engine speed)
            fRL = CalcRL(0); // Engine speed
            fTe = 0; // Rolling resistance
            // Engine torque
        }
    }

    // -----
    // Set calculated analysis data.
    // -----
    p_first->second.fVref_sp = fVref_sp; // Sets reference speed.
    p_before->second.fCarA = fCarA; // Sets acceleration.
    p_first->second.fNegrevo = fNegrevo; // Sets engine speed.
    p_first->second.fRL = fRL; // Sets load factor.
    p_first->second.fTe = fTe; // Sets engine torque.
    p_first->second.nGear = 0;
    befGearTime = 0;

    nCount++; // Increments counter.
    p_first++; // Next position processing
    p_before = p_first;
}

```



```

        p_before--;
        if( p_first != setCalculateData.end() ){
            p_first->second.nGearTime = befGearTime;
        }
    }else{
        p_first->second.fCarA = fCarA;
        p_first->second.fNegrevo = fNegrevo;
        p_first->second.fRL = 0.0;
        p_first->second.fTe = 0.0;

        p_first->second.nGear = 0;
        befGearTime = 0;

        p_first++;
        if( p_first != setCalculateData.end() ){
            p_first->second.nGearTime = befGearTime;
        }
    }

    return( true );
}
/**/
/*****
* Function name      : Calculate_Set_SteadyState
* Function summary   : Constant speed section setup processing
* Explanation        : Settings are made for constant speed section.
*
* Argument (input)   : p_first : First pointer
* Argument (input)   : p_second : Next setting pointer
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal    false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_Set_SteadyState( map<double, stCalculateData>::iterator p_first,
                                               map<double, stCalculateData>::iterator p_second )
{
    map<double, stCalculateData>::iterator p_before;
    int nRet;
    int nGear;
    int befGear;
    double befGearTime;
    double befCalcTime;
    double fCarA;
    double fVana_sp;
    double fVref_sp;
    double fVana_sp0;
    double fVref_sp0;
    // Data before section processing
    // Function return value
    // Gear position for section setting
    // Previous gear position
    // Previous gear hold time
    // Previous required time
    // Acceleration
    // Analysis vehicle speed
    // Reference vehicle speed
    // Analysis vehicle speed
    // Reference vehicle speed
}

```

```

double      fNegrevo;
double      fTe;
double      fRL;

// -----
// Initialization
// -----
p_before = p_first;
fCarA     = p_first->second.fCarA;
if( p_before != setCalculateData.begin() ){
    p_before--;
    befGear = p_before->second.nGear;
    befGearTime = p_before->second.nGearTime;
    befCalcTime = p_before->second.nCalcTime;
    fVana_sp = p_before->second.fVana_sp;
    fVref_sp = p_before->second.fVref_sp;
default)
    fVana_sp0 = p_before->second.fVana_sp;
    fVref_sp0 = p_before->second.fVref_sp;
    nGear     = p_before->second.nGear;
} else{
    befGear = p_before->second.nGear;
    befGearTime = p_before->second.nGearTime;
    befCalcTime = p_before->second.nCalcTime;
    fVana_sp = p_before->second.fVana_sp;
    fVref_sp = p_before->second.fVref_sp;
default)
    fVana_sp0 = p_before->second.fVana_sp;
    fVref_sp0 = p_before->second.fVref_sp;
    nGear     = p_before->second.nGear;
}

if( p_first != p_second ){
    while( p_first != p_second ){
        p_before = p_first;p_before--;
        fCarA = p_before->second.fCarA;

        // -----
        // Calculate speed for this time based on previous analysis vehicle speed and acceleration.
        // -----
        fVref_sp = p_first->second.fVref_sp;
        fVana_sp = fVana_sp + fCarA * befCalcTime /10.0 * 3.6;
        fRL = CalcRL( fVana_sp );

        nRet = GetNe( nGear, fVana_sp, fNegrevo );
        if (nRet == NG) return( false );

        if( fNegrevo < m_fClutch_ReleaseNe ){
            p_first->second.nFlag = 2;
            p_first->second.bIdle = true;

```

```

// Engine speed
// Engine torque
// R/L rolling resistance

```

```

// Acceleration for this time
// In case of other than first time
// Uses preceding data.
// Previous gear position
// Previous gear hold time
// Previous required time
// Analysis speed for this time (previous value as default)
// Reference vehicle speed for this time (previous value as

```

```

// Previous analysis speed
// Previous reference vehicle speed
// Previous gear position

```

```

// Previous gear position
// Previous gear hold time
// Previous required time
// Analysis speed for this time (previous value as default)
// Reference vehicle speed for this time (previous value as

```

```

// Previous analysis speed
// Previous reference vehicle speed
// Previous gear position

```

```

// In case of other than first section
// Loops according to range.

```

```

// Sets reference vehicle speed.
// Analysis vehicle speed

```

```

// R/L rolling resistance

```

```

// Engine speed

```

```

// In case of smaller than clutch release engine speed

```

```

    p_first->second.nGear = 0;
    fNegrevo = m_fClutch_ReleaseNe;
    fTe = 0;
    p_first->second.nGearTime = 0;
} else {
    nRet = GetTe( nGear, fVana_sp, fCarA, fNegrevo, fTe);
    if (nRet == NG) return( false );
    p_first->second.nGearTime = (int)befGearTime +
        p_first->second.nCalcTime;
}

p_first->second.nGearTime = (int)befGearTime +
    p_first->second.nCalcTime;

// -----
// Set calculated analysis data.
// -----
p_first->second.fVana_sp = fVana_sp;
p_first->second.fNegrevo = fNegrevo;
p_first->second.fRL = fRL;
p_first->second.fTe = fTe;
p_first->second.nGear = nGear;
// -----
// Set data for calculation below.
// -----
befGear = p_first->second.nGear;
befGearTime = p_first->second.nGearTime;
befCalcTime = p_first->second.nCalcTime;
fVana_sp = p_first->second.fVana_sp;
fVref_sp = p_first->second.fVref_sp;
fVana_sp0 = p_first->second.fVana_sp;
fVref_sp0 = p_first->second.fVref_sp;

if( p_first == p_second ){
    break;
}
p_before = p_first;
p_first++;
} else {
    p_first->second.fCarA = fCarA;
    p_first->second.fNegrevo = 0.0; // fNegrevo;
    p_first->second.fRL = 0.0; // fRL;
    p_first->second.fTe = 0.0; // fTe;
    if( p_first->second.nGear == 0 ){
        p_first->second.nGear = nGear;
    }
    befGearTime = befGearTime +
        p_first->second.nCalcTime;
}

```

```

// Engine torque
// Clears gear setting time.
// Engine torque
// Gear setup time addition setting
// Gear setup time addition setting
// Sets analysis vehicle speed.
// Sets engine speed.
// Sets load factor.
// Sets engine torque.
// Sets gear position.
// Previous gear position
// Previous gear hold time
// Previous required time
// Previous analysis speed
// Previous reference vehicle speed
// Previous analysis speed
// Previous reference vehicle speed
// Next position processing
// In case of first section
// Sets acceleration.
// Sets engine speed.
// Sets load factor.
// Sets engine torque.
// If no gear is set
// Sets gear position.
// Sets gear setup time.

```

```

    p_first++;
    if( p_first != setCalculateData.end() ){
        p_first->second.nGearTime = (int)befGearTime;
    }
}
return( true );
}
/**/
/*****
* Function name      : Calculate_Set_Deceleration
* Function summary   : Deceleration section setup processing
* Explanation        : Settings are made for deceleration section.
*
* Argument (input)   : p_first  : First pointer
* Argument (input)   : p_second : Next setting pointer
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_Set_Deceleration( map<double, stCalculateData>::iterator p_first,
                                                map<double, stCalculateData>::iterator p_second )
{
    map<double, stCalculateData>::iterator p_before; // Data before section processing
    map<double, stCalculateData>::iterator p_Next;   // Next data
    int nRet; // Function return value
    int nGear; // Gear position for section setting
    double befGearTime; // Previous gear hold time
    double befCalcTime; // Previous required time
    int nCount; // Counter
    double fCarA; // Acceleration
    double fVana_sp, calcVana; // Analysis vehicle speed
    double fVref_sp, calcVref; // Reference vehicle speed
    double fVana_sp0; // Analysis vehicle speed
    double fVref_sp0; // Reference vehicle speed
    double fNegrevo; // Engine speed
    double fTe; // Engine torque
    double fRL; // R/L rolling resistance

    // -----
    // Initialization
    // -----
    // Idling engine speed
    p_before = p_first;
    fCarA = p_first->second.fCarA; // Acceleration for this time
    nGear = p_before->second.nGear; // Gear position for this time
    if( p_before != setCalculateData.begin() ){ // In case of other than first time
        p_before--; // Uses preceding data.
    }
}

```

```

    befGearTime = p_before->second.nGearTime;
    befCalcTime = p_before->second.nCalcTime;
    fVana_sp = p_before->second.fVana_sp;
    fVref_sp = p_before->second.fVref_sp;
default)
    fVana_sp0 = p_before->second.fVana_sp;
    fVref_sp0 = p_before->second.fVref_sp;
} else {
    befGearTime = 0;
    befCalcTime = 0;
    fVana_sp = 0;
    fVref_sp = 0;
    fVref_sp0 = 0;
    fVana_sp0 = 0;
}

// -----
// Set IDLE engine speed as initial value.
// -----
fNgrevo = m_fIdleNe;
nCount = 0;
if( p_first != p_second ){
    while( p_first != p_second ){
        nGear = p_first->second.nGear;

        if( p_first != setCalculateData.begin() ){
            p_before = p_first;
            p_before--;
            befGearTime = p_before->second.nGearTime;
            befCalcTime = p_before->second.nCalcTime;
            fVana_sp = p_before->second.fVana_sp;
            fVref_sp = p_before->second.fVref_sp;
default)
            fVana_sp0 = p_before->second.fVana_sp;
            fVref_sp0 = p_before->second.fVref_sp;
        }
        fCarA = p_before->second.fCarA;

        calcVref = p_first->second.fVref_sp;
        calcVana = fVana_sp + fCarA * befCalcTime /10.0 * 3.6;
        fCarA = ( calcVref - fVana_sp ) /
                (befCalcTime / 10.0);
        fCarA = fCarA * 1000.0/(60.0*60.0);
        p_before->second.fCarA = fCarA;

// -----
// Calculate speed for this time based on previous analysis vehicle speed and acceleration.
// -----
        fVref_sp = p_first->second.fVref_sp;
        fVana_sp = fVana_sp + fCarA * befCalcTime /10.0 * 3.6;

```

```

// Previous gear hold time
// Previous required time
// Analysis speed for this time (previous value as default)
// Reference vehicle speed for this time (previous value as
// Previous analysis speed
// Previous reference vehicle speed
// Previous gear hold time
// Previous required time
// Previous analysis vehicle speed
// Previous reference vehicle speed
// _____
// _____
// In case of other than first section
// Loops according to range.
// Sets gear position for this time.
// In case of other than first time
// Uses preceding data.
// Previous gear hold time
// Previous required time
// Analysis speed for this time (previous value as default)
// Reference vehicle speed for this time (previous value as
// Previous analysis speed
// Previous reference vehicle speed
// Sets reference vehicle speed.
// Analysis vehicle speed
// Calculates acceleration.
// Calculates acceleration.
// Modifies previous acceleration.
// Sets reference vehicle speed.
// Analysis vehicle speed

```

```

fRL = CalcRL( fVana_sp ); // R/L rolling resistance

nRet = GetNe( nGear, fVana_sp, fNegrevo ); // Engine speed
if ( nRet == NG ) return( false );

if( fNegrevo < m_fClutch_ReleaseNe ) { // If smaller than clutch release engine speed
    p_first->second.nFlag = 0;
    p_first->second.bIdle = true;
    p_first->second.nGear = 0;
    fNegrevo = m_fIdleNe;
    fTe = 0; // Engine torque
    p_first->second.nGearTime = 0; // Clears gear time.
} else {
    nRet = GetTe( nGear, fVana_sp, fCarA, fNegrevo, fTe ); // Engine torque
    if ( nRet == NG ) return( false );

    p_first->second.nGearTime = (int)befGearTime + // Gear setup time addition setting
        p_first->second.nCalcTime;
}

// -----
// Set calculated analysis data.
// -----
p_first->second.fVana_sp = fVana_sp; // Sets analysis vehicle speed.
p_first->second.fNegrevo = fNegrevo; // Sets engine speed.
p_first->second.fRL = fRL; // Sets load factor.
p_first->second.fTe = fTe; // Sets engine torque.
// -----
// Set data for calculation below.
// -----
befGearTime = p_first->second.nGearTime; // Previous gear hold time
befCalcTime = p_first->second.nCalcTime; // Previous required time
fVana_sp = p_first->second.fVana_sp; // Previous analysis speed
fVref_sp = p_first->second.fVref_sp; // Previous reference vehicle speed
fVana_sp0 = p_first->second.fVana_sp; // Previous analysis speed
fVref_sp0 = p_first->second.fVref_sp; // Previous reference vehicle speed

nCount++; // Increments counter.
p_before = p_first;
p_first++; // Next position processing
}
} else { // In case of first section
    p_first->second.fCarA = fCarA; // Sets acceleration.
    p_first->second.fNegrevo = fNegrevo; // Sets engine speed.
    p_first->second.fRL = 0.0; // fRL; // Sets load factor.
    p_first->second.fTe = 0.0; // fTe; // Sets engine torque.
    if( p_first->second.nGear == 0 ) { // If no gear is set
        p_first->second.nGear = nGear; // Sets gear position.
    }
    befGearTime = befGearTime +

```

```

        p_first->second.nCalcTime;
    p_first++;
    if( p_first != setCalculateData.end() ){
        p_first->second.nGearTime = (int)befGearTime;
    }
}

return( true );
}
/**/
/*****
* Function name      : Calculate_Set_Acceleration
* Function summary   : Acceleration section setup processing
* Explanation        : Settings are made for acceleration section.
*
* Argument (input)   : p_first : First pointer
* Argument (input)   : p_second : Next setting pointer
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_Set_Acceleration( map<double, stCalculateData>::iterator p_first,
                                                map<double, stCalculateData>::iterator p_second )
{
    map<double, stCalculateData>::iterator p_before; // Data before section processing
    int nRet; // Function return value
    bool bRet; // Function return value
    int nGear; // Gear position for section setting
    int befGear; // Previous gear position
    double befGearTime; // Previous gear hold time
    double befCalcTime; // Previous required time
    int nCount; // Counter
    double fCarA; // Acceleration
    double fVana_sp, calcVana; // Analysis vehicle speed
    double fVref_sp, calcVref; // Reference vehicle speed
    double fVana_sp0; // Analysis vehicle speed
    double fVref_sp0; // Reference vehicle speed
    double fNegrevo; // Engine speed
    double fTe; // Engine torque
    double fRL; // R/L rolling resistance

    // -----
    // Initialization
    // -----
    p_before = p_first;
    fCarA = p_first->second.fCarA; // Acceleration for this time
    nGear = p_before->second.nGear; // Gear position for this time
    if( p_before != setCalculateData.begin() ){ // In case of other than first time

```

```

    p_before--;
    befGear = p_before->second.nGear;
    befGearTime = p_before->second.nGearTime;
    befCalcTime = p_before->second.nCalcTime;
    fVana_sp = p_before->second.fVana_sp;
    fVref_sp = p_before->second.fVref_sp;
default)
    fVana_sp0 = p_before->second.fVana_sp;
    fVref_sp0 = p_before->second.fVref_sp;
} else{
    befGear = 0;
    befGearTime = 0;
    befCalcTime = 0;
    fVana_sp = 0;
    fVref_sp = 0;
    fVref_sp0 = 0;
    fVana_sp0 = 0;
}

// -----
// Set IDLE engine speed as initial value.
// -----
fNegrevo = m_fIdleNe;
nCount = 0;
if( p_first != p_second ){
    while( p_first != p_second ){
        nGear = p_first->second.nGear;
        if( nGear == 0 ){
            if( befGear != 0 ){
                p_first->second.nGear = befGear;
                nGear = befGear;
            }
        }
    }

    if( p_first != setCalculateData.begin() ){
        p_before = p_first;
        p_before--;
        befGear = p_before->second.nGear;
        befGearTime = p_before->second.nGearTime;
        befCalcTime = p_before->second.nCalcTime;
        fVana_sp = p_before->second.fVana_sp;
        fVref_sp = p_before->second.fVref_sp;
default)
        fVana_sp0 = p_before->second.fVana_sp;
        fVref_sp0 = p_before->second.fVref_sp;
    }
    fCarA = p_before->second.fCarA;

    if( befGear == 0 ){
        befGear = nGear;
    }
}

```

```

// Uses preceding data.
// Previous gear position
// Previous gear hold time
// Previous required time
// Analysis speed for this time (previous value as default)
// Reference vehicle speed for this time (previous value as
// Previous analysis speed
// Previous reference vehicle speed
// Previous gear position
// Previous gear hold time
// Previous required time
// Previous analysis vehicle speed
// Previous reference vehicle speed
//
//
// In case of other than first section
// Loops according to range.
// Sets gear position for this time.
// Sets gear position for this time.
// In case of other than first time
// Uses preceding data.
// Previous gear position
// Previous gear hold time
// Previous required time
// Analysis speed for this time (previous value as default)
// Reference vehicle speed for this time (previous value as
// Previous analysis speed
// Previous reference vehicle speed
// Due to no acceleration available with gear position 0
// sets current gear position.

```



```

// -----
// Check max. acceleration based on previous analysis speed, gear, and engine speed.
// -----
calcVref = p_first->second.fVref_sp; // Sets reference vehicle speed to prepare for calculation.
calcVana = p_first->second.fVref_sp;
bRet = CalcTeMaxSp(nGear, (befCalcTime / 10.0), fVana_sp, calcVana, fNegrevo);
if( bRet == false ){
    return( false );
}
fCarA = (( calcVana - fVana_sp) / (befCalcTime / 10.0)) * 1000.0/(60.0*60.0); // Calculates acceleration.

p_before->second.fCarA = fCarA; // Modifies previous acceleration.
// -----
// Calculate speed for this time based on previous analysis vehicle speed and acceleration.
// -----
fVref_sp = p_first->second.fVref_sp; // Sets reference vehicle speed.
fVana_sp = calcVana; // Analysis vehicle speed
fRL = CalcRL(fVana_sp); // R/L rolling resistance

// -----
// Separate cases between free-running time and other.
// -----
if( p_first->second.nTimeFlg == 3 ){ // In case of t3 section (free-running time during shift-up)
    if(fNegrevo < m_fClutch_ReleaseNe ){ // If smaller than clutch release engine speed
        fNegrevo = m_fClutch_ReleaseNe;
    }
    p_first->second.nGearTime = 0; // Clears gear setup time.
} else {
    if( fNegrevo < m_fClutch_MeetNe ){
        fNegrevo = m_fClutch_MeetNe;
    }
    p_first->second.nGearTime = (int)befGearTime + // Gear setup time addition setting
        p_first->second.nCalcTime;
}
nRet = GetTe( nGear, fVana_sp, fCarA, fNegrevo, fTe); // Engine torque
if (nRet == NG){
    return( false );
}

// -----
// Set calculated analysis data.
// -----
p_first->second.fVana_sp = fVana_sp; // Sets analysis vehicle speed.
p_first->second.fNegrevo = fNegrevo; // Sets engine speed.
p_first->second.fRL = fRL; // Sets load factor.
p_first->second.fTe = fTe; // Sets engine torque.

// -----
// Set data for calculation below.
// -----
befGear = p_first->second.nGear; // Previous gear position

```

```

    befGearTime = p_first->second.nGearTime;
    befCalcTime = p_first->second.nCalcTime;
    fVana_sp = p_first->second.fVana_sp;
    fVref_sp = p_first->second.fVref_sp;
    fVana_sp0 = p_first->second.fVana_sp;
    fVref_sp0 = p_first->second.fVref_sp;

    nCount++;
    p_before = p_first;
    p_first++;

    if(( p_first == p_second )&&
       ( fVana_sp < fVref_sp )){
        if( p_second->second.fVref_sp < fVana_sp ){
            break;
        }else{
            p_second++;
            p_second->second.nGear = befGear;
            p_first->second.nFlag = 5;
        }
    }
}
}else{
    p_first->second.fCarA = fCarA;
    p_first->second.fNegrevo = fNegrevo;
    p_first->second.fRL = 0.0; // fRL;
    p_first->second.fTe = 0.0; // fTe;
    if( p_first->second.nGear == 0 ){
        p_first->second.nGear = nGear;
    }
    befGearTime = befGearTime +
                  p_first->second.nCalcTime;
    p_first++;
    if( p_first != setCalculateData.end() ){
        p_first->second.nGearTime = (int)befGearTime;
    }
}

return( true );
}
/**/
// #####
// -----
// Section setup processing starts here.
// Vehicle starting processing      T1T2Set
// Shift-up      T3Set
// -----
// #####
*****
* Function name      : Calculate_T1T2Set
* Function summary   : Starting T1-T2 section setup processing

```

```

// Previous gear hold time
// Previous required time
// Previous analysis speed
// Previous reference vehicle speed
// Previous analysis speed
// Previous reference vehicle speed

// Increments counter.

// Next position processing

// In case of first section
// Sets acceleration.
// Sets engine speed.
// Sets load factor.
// Sets engine torque.
// If no gear position is set
// Sets gear position.

// Sets gear setup time.
// Next position processing
// In case of other than final data
// Sets gear setup time.

```

```

* Explanation      : Detailed setup processing is executed for starting section.
*
* Argument (input) : None
* Argument (output): None
* Argument (I/O)   : None
* Return value     : true : Normal   false : Failure
* Created by       :
* Updated on (created on) :
* Remarks          :
*****/
bool TCalculateProc::Calculate_T1T2Set()
{
    map<double, stCalculateData>::iterator p_first; // First data
    map<double, stCalculateData>::iterator p_second; // Next data
    map<double, stCalculateData>::iterator p_betwn; // Identifies pointers before and after.
    stCalculateData tmpCalculateData; // Temporary analysis data
    int tmpnTimeFlg; // Temporary t1-t6 flag
    int tmpBeforeFlag; // Preceding flag

    p_first = setCalculateData.begin(); // Sets first data.
    p_second = setCalculateData.end(); // Sets end position.
    tmpBeforeFlag = 0; // Sets preceding flag.

    // -----
    // t2 section (time to reach starting engine speed),
    // t1-t2 section (time from starting engine speed to acceleration speed (t1-t2))
    // If not in analysis data, make additional settings.
    // -----
    for( p_setCalculateData = setCalculateData.begin();
        p_setCalculateData != setCalculateData.end();
        p_setCalculateData++ ){ // Checks all analysis data items.

        // -----
        // Starting position search
        // -----
        if( ( tmpBeforeFlag == 0 ) &&
            ( p_setCalculateData->second.nFlag == 5 ) &&
            ( p_setCalculateData->second.nTimeFlg == 0 ) ){ // If starting position is found
            memset( &tmpCalculateData, 0x00, sizeof( tmpCalculateData ) ); // Initializes temporary data.
            // -----
            // Set t2 section.
            // -----
            tmpCalculateData.fTimes = p_setCalculateData->second.fTimes; // Obtains position by subtracting T1 (time required for
starting) // from time vehicle speed reaches acceleration.
            tmpCalculateData.nCalcTime = (int)(0.0); // Section is t2 sec. only.
            tmpCalculateData.bIdle = false; // IDLE state cannot be entered.
            tmpCalculateData.bClutch = true; // Clutch engaged state
            tmpCalculateData.nTimeFlg = 2; // Sets t2 and time flag.
            tmpCalculateData.nFlag = 1; // Sets flag in starting data.
        }
    }
}

```



```

    }else{
        p_setCalculateData->second.nCalcTime = 0;
    }

}

// -----
// Set required time as well.
// -----
p_second = p_setCalculateData; p_second++; // Sets next position.
if( p_second != setCalculateData.end() ){
    p_setCalculateData->second.nCalcTime = (int)(p_second->second.fTimes -
                                                p_setCalculateData->second.fTimes); // Sets required time from current time.
}else{ // In case of end of data
    p_setCalculateData->second.nCalcTime = 0; // Sets required time to 0.
}

return( true );
}
/**/
/*****
* Function name      : Calculate_Start_Following
* Function summary   : Starting target-speed follow processing
* Explanation        : Settings are made for the case in which target-speed follow is impossible
*                    : during vehicle start.
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : p_first : First pointer
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_Start_Following( map<double, stCalculateData>::iterator &p_first )
{
    map<double, stCalculateData>::iterator p_tmpCalculate; // Temporary pointer
    map<double, stCalculateData>::iterator p_second; // Next data
    map<double, stCalculateData>::iterator p_betwn; // Identifies pointers before and after.
    map<double, stCalculateData>::iterator p_start; // Temporary pointer
    int nRet; // Return value of function to be recalled
    int tmpNowGear; // Temporary gear position
    double tmpVana_sp; // Previous analysis speed
    double tmpNegrevo; // Previous engine speed
    double tmpGearTime; // Gear required time
    double tmpCalcTime; // Required time
    double fBeforeA; // Previous acceleration
    double fCarA; // Previous acceleration
    double fNegrevo; // Engine speed
    double fTe; // Engine torque

```

```

double fTe_def;
double fTeMax;
double fRL;
double fCarV;
double fGearti;
double calcVana;
bool bRet;
int nNowGear;

p_start = p_first;
p_tmpCalculate = p_first;
if( p_first != setCalculateData.begin() ){
    p_tmpCalculate--;
}

tmpNowGear = p_tmpCalculate->second.nGear;
if( tmpNowGear == 0 ){
    tmpNowGear = m_nInitGear;
}
nNowGear = tmpNowGear;
tmpVana_sp = p_tmpCalculate->second.fVana_sp;
tmpNegrevo = p_tmpCalculate->second.fNegrevo;
tmpGearTime = p_tmpCalculate->second.nGearTime;
tmpCalcTime = p_tmpCalculate->second.nCalcTime;
fBeforeA = p_tmpCalculate->second.fCarA;
// -----
// Determine engine speed availability with current gear position.
// -----
// Calculate engine speed.
fNegrevo = m_fIdleNe ;
nRet = GetGearIN(tmpNowGear, fGearti);
if (nRet == NG) return( false );
// Calculate vehicle speed.
fCarV = (2.0 * CalculateProc->m_fPAI * m_fTarR) / 1000.0 * 60.0 * fNegrevo
        / fGearti;

CHECK_AGAIN:
p_tmpCalculate = p_first;
if( p_first != setCalculateData.begin() ){
    p_tmpCalculate--;
}

tmpVana_sp = p_tmpCalculate->second.fVana_sp;
tmpNegrevo = p_tmpCalculate->second.fNegrevo;
tmpGearTime = p_tmpCalculate->second.nGearTime;
tmpCalcTime = p_tmpCalculate->second.nCalcTime;
fBeforeA = p_tmpCalculate->second.fCarA;

for( ; ; p_first++){
    if(( p_first->second.nFlag != 5 ) &&
        ( p_first->second.nFlag != 1 )){
        p_first--;
    }
}

```

```

// Engine torque
// Engine torque
// R/L rolling resistance
// Max. vehicle speed value with clutch in
// Gear ratio
// Speed data for calculation

// Applicable gear

// Sets preceding data point.

// Sets preceding gear position.

// Applicable gear
// Previous analysis speed
// Previous engine speed
// Previous gear time
// Previous required time
// Previous acceleration

// Time for clutch to engage

// Sets preceding data point.

// Previous analysis speed
// Previous engine speed
// Previous gear time
// Previous required time
// Previous acceleration

// All sections subject to determination

```

```

        break;
    }
    calcVana = p_first->second.fVref_sp;
    fCarA = (( calcVana - tmpVana_sp) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
    nRet = GetNe( nNowGear, calcVana, fNegrevo); // Engine speed
    if( nRet == NG ){
        return( false );
    }
    nRet = GetTe_NotRevise( nNowGear, calcVana, fCarA, fNegrevo, fTe_def);
    if( nRet == NG ){
        return( false );
    }

    calcVana = p_first->second.fVref_sp;
    bRet = CalcTeMaxSp( nNowGear, (tmpCalcTime / 10.0), tmpVana_sp, calcVana, fNegrevo );
    fCarA = (( calcVana - tmpVana_sp) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);

    p_tmpCalculate = p_first;
    if( p_tmpCalculate != setCalculateData.begin() ){
        p_tmpCalculate--;
    }
    p_tmpCalculate->second.fCarA = fCarA;

    p_first->second.fVana_sp = calcVana; // Sets analysis speed.
    if( fCarA == 0 ){ // If acceleration is 0
        fNegrevo = tmpNegrevo; // Sets previous engine speed.
    }
    if( fNegrevo < m_fClutch_MeetNe ){
        fNegrevo = m_fClutch_MeetNe;
    }

    fRL = CalcRL( calcVana ); // Rolling resistance
    nRet = GetTe( nNowGear, calcVana, fCarA, fNegrevo, fTe); // Engine torque
    if( nRet == NG ){
        return( false );
    }

    fTeMax = GetLineReviseMaxTorque( fNegrevo );
    if( fTe_def > fTeMax ){
        if( nNowGear >= m_nInitGear ){
            nNowGear = 1;
            p_first = p_start;
            goto CHECK_AGAIN;
        }
    }

    p_first->second.fNegrevo = fNegrevo; // Sets engine speed.
    p_first->second.fRL = fRL; // Sets rolling resistance.
    p_first->second.fTe = fTe; // Sets engine torque.
    p_first->second.nGear = nNowGear; // Sets gear position.
    p_first->second.nFlag = 1;

```

```

    p_first->second.nGearTime = (int)tmpGearTime + (int)tmpCalcTime;
    p_second = p_first; p_second++;
    if( fCarV < tmpVana_sp ){
        p_first->second.bIdle = true;
        break;
    }
    if( p_first == setCalculateData.end() ){
        break;
    }
    tmpVana_sp = p_first->second.fVana_sp;
    fBeforeA   = p_first->second.fCarA;
    tmpNegrevo = p_first->second.fNegrevo;
    tmpGearTime = p_first->second.nGearTime;
    tmpCalcTime = p_first->second.nCalcTime;

    // -----
    // If 5% normalized engine speed reached
    // -----
    if( fNegrevo > m_fClutch_MeetNe ){
        break;
    }
}

return( true );
}
/**/
/*****
* Function name      : Calculate_T3Set
* Function summary   : Acceleration T3 section setup processing
* Explanation        : Detailed settings are made for acceleration.
*                   :
* Argument (input)   : p_first  : First pointer
* Argument (input)   : p_second : Next setting pointer
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_T3Set(map<double, stCalculateData>::iterator p_first,
    map<double, stCalculateData>::iterator &p_second )
{
    map<double, stCalculateData>::iterator p_tmpCalculate;
    map<double, stCalculateData>::iterator p_Set;
    map<double, stCalculateData>::iterator p_Next;
    map<double, stCalculateData>::iterator p_betwn;
    map<double, stCalculateData>::iterator p_before;
    stExceedForce tmpExceedForce;
    stCalculateData tmpCalculateData;
    int i;
}
// Temporary pointer
// Temporary repeat data
// Temporary repeat data (next pointer)
// Identifies pointers before and after.
// Previous data
// Structure for search
// Temporary analysis data

```



```

bool    bRet;
int     tmpNowGear;
int     tmpGear;
double  tmpVref_sp;
double  tmpVana_sp;
double  tmpGearTime;
double  tmpCalcTime;
double  fBeforeA;
int     nBefGear;
bool    bShiftUpFlag;
bool    bIdleUpFlag;
int     nRet;
double  calcVana;
double  fNeMinLimit;
double  fNeMaxTopLimit;
double  tmpV;
double  fTe, fTeMax;
double  tmpNegrevo;
double  fDiffDistance;

p_tmpCalculate = p_first;
p_tmpCalculate--;

tmpNowGear = p_tmpCalculate->second.nGear;
tmpVana_sp = p_tmpCalculate->second.fVana_sp;
tmpVref_sp = p_tmpCalculate->second.fVref_sp;
fBeforeA   = p_tmpCalculate->second.fCarA;
tmpGearTime = p_tmpCalculate->second.nGearTime;
tmpCalcTime = p_tmpCalculate->second.nCalcTime;

bShiftUpFlag = false;
bIdleUpFlag = false;
// -----
// Execute processing for starting from intermediate point.
// -----
if(( p_tmpCalculate->second.bIdle == true ) &&
    ( tmpNowGear == 0 )){
    // Search for prospective gear for conditions.
    memset( &tmpCalculateData, 0x00, sizeof( tmpCalculateData ));
    tmpCalculateData.fTimes = p_first->second.fTimes + m_fTg* 10.0;

    p_Set = p_first;
    p_Next = setCalculateData.find( tmpCalculateData.fTimes );
    tmpGear = 0;
    tmpNowGear = m_nInitGear;
    bRet = Calculate_GearUp( p_Set, p_Next, fDiffDistance, tmpNowGear );
    bIdleUpFlag = true;
} else if(( p_tmpCalculate->second.fTe < 0 ) && ( tmpNowGear != 0 )){
    nBefGear = tmpNowGear;
    bRet = Calculate_RatedDown( p_first, p_second, tmpGear, tmpNowGear );
    if( bRet == true ){

```

```

// Temporary gear position
// Prospective gear position
// Previous reference speed
// Previous analysis speed
// Gear required time
// Required time
// Previous acceleration
// Previous gear position
// Flag to determine shift-up

// Return value of function to be recalled
// Analysis speed for calculation
// Engine speed determination lower limit
// Max. engine speed rate
// Temporary speed
// Torque for calculation
// Previous engine speed

// Sets preceding data point.

// Sets preceding gear position.
// Previous analysis speed
// Previous reference vehicle speed
// Previous reference acceleration
// Sets gear hold time.
// Sets required time.

// If gear is at neutral
// Initializes temporary data.
// Sets gear hold time for shift-up.

```

```

// Up to end of gear hold time
// Initializes prospective gear.

// Gear hold check

```

```

    tmpNowGear = tmpGear;
}

if( nBefGear != tmpNowGear ){
    bldleUpFlag = true;
    tmpGearTime = 0;
}
} else {
    tmpNowGear = p_tmpCalculate->second.nGear;
}

// -----
// Temporarily apply current gear to all processing steps.
// -----
for( p_tmpCalculate = p_first;
      p_tmpCalculate != p_second; p_tmpCalculate++ ){
    p_tmpCalculate->second.nGear = tmpNowGear; // Sets current gear.
    if( bldleUpFlag == true ){
        p_tmpCalculate->second.nGearTime = 0;
    }
}

// -----
// Determine engine speed availability with current gear.
// -----
for( p_tmpCalculate = p_first;
      p_tmpCalculate != p_second;
      p_tmpCalculate++ ){
    if( p_tmpCalculate->second.nGear == 0 ){ // All sections subject to determination
        continue; // Check in case of gear being activated
    }

    if( p_tmpCalculate != p_first ){
        p_before = p_tmpCalculate; // Previous set value
        p_before--; // Previous gear time
        tmpGearTime = p_before->second.nGearTime; // Previous required time
        tmpCalcTime = p_before->second.nCalcTime; // Previous acceleration
        fBeforeA = p_before->second.fCarA; // Previous analysis speed
        tmpVana_sp = p_before->second.fVana_sp; // Previous reference vehicle speed
        tmpVref_sp = p_before->second.fVref_sp; // Sets preceding gear.
        tmpNowGear = p_before->second.nGear;
    }

    if( tmpNowGear == 0 ){ // Since 0 gear is not available.
        tmpNowGear = p_tmpCalculate->second.nGear; // sets current gear.
    }
    nBefGear = tmpNowGear;

    // Set analysis speed (temporarily).
    p_tmpCalculate->second.fVana_sp = p_tmpCalculate->second.fVref_sp;

```

```

p_before = p_tmpCalculate;
p_before--; // Sets preceding data point.

tmpV = p_before->second.fVana_sp;
tmpCalcTime = p_before->second.nCalcTime; // Previous required time

// -----
// Obtain acceleration for reaching this-time vehicle speed.
// -----
calcVana = p_tmpCalculate->second.fVref_sp;
bRet = CalcTeMaxSp(tmpNowGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
if( bRet == false ){
    return( false );
}
fBeforeA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
p_before->second.fCarA = fBeforeA;
p_tmpCalculate->second.fVana_sp = calcVana;

if(((tmpGearTime + tmpCalcTime) / 10.0) < m_fTg) { // Checks gear hold time.
    bShiftUpFlag = false;
} else {
    // evolution arithmetic determination of lower limit
    memset( &tmpExceedForce, 0x00, sizeof( tmpExceedForce )); // Initializes search structure.
    tmpExceedForce.nGear = tmpNowGear; // Sets gear.
    fNeMinLimit = m_ExceedForce.find( tmpExceedForce )->fMinNe; // Sets lower-limit engine speed.
    fNeMaxTopLimit = m_fOutputRotation;

    while(1) {
        tmpGear = tmpNowGear; // Holds data before gear setting.
        // Shift-up if maximum engine speed criterion is exceeded.
        if( tmpNegrevo >= fNeMaxTopLimit) { // If engine speed is equal to or more than maximum engine
speed value
            bRet = Calculate_RatedUp( p_tmpCalculate, p_second, tmpGear, tmpNowGear);
            if( bRet == true ){
                tmpNowGear = tmpGear;
            }
            break;
        }

        calcVana = p_tmpCalculate->second.fVref_sp;
        fBeforeA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
        nRet = GetNe( tmpNowGear, calcVana, tmpNegrevo); // Obtains engine speed.
        if( nRet == NG ){
            return(false);
        }

        if( tmpNegrevo <= fNeMinLimit) { // In case of min. engine speed or less
            bRet = Calculate_RatedDown( p_tmpCalculate, p_second, tmpGear, tmpNowGear );
            if( bRet == true ){

```

```

        tmpNowGear = tmpGear;
    }
}

nRet = GetTe_NotRevise( tmpNowGear, calcVana, fBeforeA, tmpNegrevo, fTe); // Engine torque (without complement)
fTeMax = GetLineReviseMaxTorque(tmpNegrevo); // Linear interpolation
if( fTe > fTeMax ){ // Current status maintenance, shift-down
    if( tmpNowGear -1 >= m_nInitGear ){
        tmpGear = tmpNowGear;
        for( i = 0; i < 3; i++){
            memset( &tmpCalculateData, 0x00, sizeof( tmpCalculateData )); // Initializes temporary data.
            tmpCalculateData.fTimes = p_tmpCalculate->second.fTimes +(m_fTg - i)* 10.0; // Sets free-running time for shift-up.
            p_Set = p_tmpCalculate;
            p_Next = setCalculateData.find( tmpCalculateData.fTimes ); // Up to end of gear hold time
            bRet = Calculate_TeMinGear( p_tmpCalculate, i, tmpNowGear );
            if( bRet == true ){
                break;
            }
        }
    }
    break;
}

break;
}

if( nBefGear != tmpNowGear ){
    // -----
    // Obtain acceleration for reaching this-time vehicle speed.
    // -----
    calcVana = p_tmpCalculate->second.fVref_sp;
    bRet = CalcTeMaxSp(tmpNowGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
    if( bRet == false ){
        return( false );
    }
    fBeforeA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
    p_before->second.fCarA = fBeforeA;
    p_tmpCalculate->second.fVana_sp = calcVana;
    p_tmpCalculate->second.nGear = tmpNowGear;
} else {
    tmpGear = tmpNowGear;
    calcVana = p_tmpCalculate->second.fVana_sp;
    nRet = GetNe( tmpGear, calcVana, tmpNegrevo ); // Obtains engine speed.
    if( nRet == NG ){
        return(false);
    }
    nRet = GetTe_NotRevise( tmpGear, calcVana, fBeforeA, tmpNegrevo, fTe); // Engine torque (without complement)
    fTeMax = GetLineReviseMaxTorque(tmpNegrevo); // Linear interpolation
    if( fTe <= fTeMax ){
        memset( &tmpCalculateData, 0x00, sizeof( tmpCalculateData )); // Initializes temporary data.
        tmpCalculateData.fTimes = p_tmpCalculate->second.fTimes +m_fTg* 10.0; // Sets free-running time for shift-up.
    }
}

```

```

    p_Set = p_tmpCalculate;
    p_Next = setCalculateData.find( tmpCalculateData.fTimes );           // Up to end of gear hold time
    // -----//
    // Check with gear excess torque ratio.
    // -----//
    bRet = Calculate_GearUp( p_Set, p_Next, fDiffDistance, tmpNowGear ); // Checks until shift-up is impossible with available gear.
}

// -----//
// Obtain acceleration for reaching this-time vehicle speed.
// -----//
calcVana = p_tmpCalculate->second.fVref_sp;
bRet = CalcTelMaxSp( tmpNowGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
if( bRet == false ){
    return( false );
}
fBeforeA = (( calcVana - tmpV ) / (tmpCalcTime / 10.0)) * 1000.0 / (60.0*60.0);
p_before->second.fCarA = fBeforeA;
p_tmpCalculate->second.fVana_sp = calcVana;
p_tmpCalculate->second.nGear = tmpNowGear;
}
bShiftUpFlag = true;
}

// -----//
// Make settings for shift-up T3 section.
// -----//
if( ( bShiftUpFlag == true ) && ( nBefGear != tmpNowGear ) ) {           // If shift-up is executed
    bIdleUpFlag = false;
    p_tmpCalculate->second.nGearTime = 0;                                 // Sets gear time to 0.
    p_tmpCalculate->second.nTimeFlg = 3;                                 // Section is t3.
    p_Set = p_tmpCalculate;

    tmpGearTime = 0;
    for( ; p_Set != p_second; p_Set++ ) {                               // Sets remaining gears as set gear.
        p_Set->second.nGear = tmpNowGear;                               // Sets gear again.
        if( p_Set != p_tmpCalculate ) {
            p_Set->second.nGearTime = (int)tmpGearTime + (int)tmpCalcTime; // Sets gear hold time.
            tmpGearTime = p_Set->second.nGearTime;                       // Previous gear time
        }
        tmpCalcTime = p_Set->second.nCalcTime;                          // Previous required time
    }
    // Write to next data as well.
    if( p_Set != setCalculateData.end() ) {
        p_Set->second.nGear = tmpNowGear;                               // Sets gear again.
        p_Set->second.nGearTime = (int)tmpGearTime + (int)tmpCalcTime; // Sets gear hold time.
        tmpCalcTime = p_Set->second.nCalcTime;                         // Previous required time
        tmpGearTime = p_Set->second.nGearTime;                         // Previous gear time
    }
} else {

```

```

    if( bIdleUpFlag == true ){
        bIdleUpFlag = false;
        if( tmpGearTime != 0.0 ){
            p_tmpCalculate->second.nGearTime = (int)tmpGearTime +
                (int)tmpCalcTime; // Sets gear hold time.
        }
    } else {
        p_tmpCalculate->second.nGear = tmpNowGear; // Sets gear again.
        p_tmpCalculate->second.nGearTime = (int)tmpGearTime +
            (int)tmpCalcTime; // Sets gear hold time.
    }
}

// -----
// Calculate acceleration again.
// -----
BtwCarASet(p_first, p_second);

return( true );
}
/**/
/*****
* Function name      : Calculate_RatedUp
* Function summary   : Acceleration T3 section confirmation processing
* Explanation        : Availability of running with applicable gear during acceleration
*                   : is Gear UP checked.
* Argument (input)   : p_first : First pointer
*                   : p_second : Next setting pointer
*                   : tmpGear  : Gear position
*                   : OrgGear  : Now Gear position
* Argument (I/O)     : None
* Return value       : true : Maintaining OK   false : Maintaining NG
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_RatedUp(map<double, stCalculateData>::iterator p_first,
    map<double, stCalculateData>::iterator p_second,
    int &NewGear, int OrgGear )
{
    map<double, stCalculateData>::iterator p_tmpCalculate; // Temporary pointer
    map<double, stCalculateData>::iterator p_Set; // Temporary repeat data
    map<double, stCalculateData>::iterator p_Next; // Temporary repeat data (next pointer)
    stCalculateData tmpCalculateData; // Temporary analysis data
    int i;
    bool bRet;
    int tmpNowGear; // Temporary gear position
    int tmpGear; // Prospective gear position
    double fDiffDistance;

```

```

p_tmpCalculate = p_first;
tmpNowGear = OrgGear;

memset( &tmpCalculateData, 0x00, sizeof( tmpCalculateData )); // Initializes temporary data.
tmpCalculateData.fTimes = p_tmpCalculate->second.fTimes +m_fTg* 10.0; // Sets free-running time for shift-up.
p_Set = p_tmpCalculate;
p_Next = setCalculateData.find( tmpCalculateData.fTimes ); // Up to end of gear hold time

if( p_Next->second.fTimes > p_second->second.fTimes ){
    p_Next = p_second;
}

tmpGear = tmpNowGear; // Holds data before gear setting.
// -----//
// Check with gear excess torque ratio.
// -----//
bRet = Calculate_GearUp( p_Set, p_Next, fDiffDistance, tmpNowGear ); // Checks until shift-up is impossible with available gear.
if(( tmpNowGear == tmpGear )&&( tmpNowGear +1 <= m_nMaxGear )){
    for( i = 0; i < 3; i++){
        tmpGear = tmpNowGear; // Holds data before gear setting.
        memset( &tmpCalculateData, 0x00, sizeof( tmpCalculateData )); // Initializes temporary data.
        tmpCalculateData.fTimes = p_tmpCalculate->second.fTimes +(m_fTg - i)* 10.0; // Sets free-running time for shift-up.
        p_Set = p_tmpCalculate;
        p_Next = setCalculateData.find( tmpCalculateData.fTimes ); // Up to end of gear hold time

        if( p_Next->second.fTimes > p_second->second.fTimes ){
            p_Next = p_second;
        }

        // -----//
        // Check with gear excess torque ratio.
        // -----//
        bRet = Calculate_MaxNeGearUp( p_Set, p_Next, tmpNowGear ); // Checks until shift-up is impossible with available gear.
        if( tmpNowGear != tmpGear ){
            break;
        }
    }
}
NewGear = tmpNowGear;

if( NewGear != OrgGear ){
    return( true );
}else{
    return( false );
}
}
/**/
/*****

```

ConvertD\_pub.cpp

```
* Function name      : Calculate_RatedDown
* Function summary   : Acceleration T3 section confirmation processing
* Explanation        : Availability of running with applicable gear during acceleration
*                   : is Gear DOWN checked.
* Argument (input)  : p_first : First pointer
* Argument (input)  : p_second : Next setting pointer
* Argument (input)  : tmpGear  : Gear position
* Argument (input)  : OrgGear  : Now Gear position
* Argument (I/O)    : None
* Return value      : true : Maintaining OK   false : Maintaining NG
* Created by        :
* Updated on (created on) :
* Remarks           :
```

\*\*\*\*\*/

```
bool TCalculateProc::Calculate_RatedDown(map<double, stCalculateData>::iterator p_first,
                                         map<double, stCalculateData>::iterator p_second,
                                         int &NewGear, int OrgGear )
{
    map<double, stCalculateData>::iterator p_tmpCalculate; // Temporary pointer
    map<double, stCalculateData>::iterator p_Set; // Temporary repeat data
    map<double, stCalculateData>::iterator p_Next; // Temporary repeat data (next pointer)
    stCalculateData tmpCalculateData; // Temporary analysis data
    int i;
    bool bRet;
    int tmpNowGear; // Temporary gear position
    int tmpGear; // Prospective gear position

    p_tmpCalculate = p_first;
    tmpNowGear = OrgGear;

    // Search for prospective gear for conditions.
    memset( &tmpCalculateData, 0x00, sizeof( tmpCalculateData )); // Initializes temporary data.
    tmpCalculateData.fTimes = p_first->second.fTimes +m_fTg* 10.0; // Sets gear hold time for shift-up.

    p_Set = p_first;
    p_Next = setCalculateData.find( tmpCalculateData.fTimes ); // Up to end of gear hold time
    tmpGear = 0; // Initializes prospective gear.
    for( tmpNowGear = OrgGear;
         tmpNowGear >= m_nInitGear; tmpNowGear-- ){
        bRet = Calculate_T3Check( p_Set, p_Next, tmpNowGear, OrgGear ); // Gear hold check
        if( bRet == true ){ // If gear can be set
            tmpGear = tmpNowGear; // Sets as prospective gear.
            break;
        }
    }
    if( tmpGear != 0 ){ // If prospective gear is set
        tmpNowGear = tmpGear; // Sets the gear.
    }
    if( tmpNowGear <= m_nInitGear ){ // If no applicable gear is found
        tmpNowGear = m_nInitGear; // Forcibly sets gear.
        for( i = 0; i < 3; i++ ){
```



```

tmpGear = tmpNowGear;
memset( &tmpCalculateData, 0x00, sizeof( tmpCalculateData ) );
tmpCalculateData.fTimes = p_first->second.fTimes +(m_fTg - i)* 10.0;
p_Set = p_first;
p_Next = setCalculateData.find( tmpCalculateData.fTimes );

// -----//
// Check with gear excess torque ratio.
// -----//
bRet = Calculate_MaxNeGearUp( p_Set, p_Next, tmpNowGear );
if( tmpNowGear != tmpGear ){
    break;
}
}
NewGear = tmpNowGear;

if( NewGear != OrgGear ){
    return( true );
}else{
    return( false );
}
}
/**/
/*****
* Function name      : Calculate_T3Check
* Function summary   : Acceleration T3 section confirmation processing
* Explanation        : Availability of running with applicable gear during acceleration
*                   : is checked.
* Argument (input)   : p_first  : First pointer
*                   : p_second  : Next setting pointer
*                   : tmpGear   : Gear position
*                   : OrgGear   : Now Gear position
* Argument (I/O)     : None
* Return value       : true : Maintaining OK   false : Maintaining NG
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_T3Check( map<double, stCalculateData>::iterator p_first,
                                       map<double, stCalculateData>::iterator p_second,
                                       int tmpGear, int OrgGear )
{
    map<double, stCalculateData>::iterator p_tmpCalculate;
    map<double, stCalculateData>::iterator p_befCalculate;
    int nRet;
    bool bRet;
    bool bFlag;
    double fTe, fTeMax;
    double tmpNegrevo;
    double tmpV;

// Temporary pointer
// Temporary pointer
// Return value of function to be recalled
// Flag to determine whether current status can be maintained
// Torque for calculation
// Previous engine speed
// Temporary speed

```

```

double tmpVref_sp; // Temporary reference speed
double tmpCalcTime; // Engine speed determination lower limit
double fNeMinLimit; // Max. engine speed rate
double fNeMaxTopLimit; // Acceleration
double befNegrevo; // Analysis speed for calculation
double fCarA; // Structure for search
double calcVana;
stExceedForce tmpExceedForce;

bFlag = true; // Current status maintain state flag

if( tmpGear > m_nMaxGear ){
    return(false);
}

// evolution arithmetic determination of lower limit
memset( &tmpExceedForce, 0x00, sizeof( tmpExceedForce ) ); // Initializes search structure.
tmpExceedForce.nGear = tmpGear; // Sets gear.
fNeMinLimit = m_ExceedForce.find( tmpExceedForce )->fMinNe; // Sets lower-limit engine speed.
fNeMaxTopLimit = m_fOutputRotation;

p_befCalculate = p_first; // Preceding speed
p_befCalculate--;

tmpV = p_befCalculate->second.fVana_sp; // Preceding analysis speed
tmpVref_sp = p_befCalculate->second.fVref_sp; // Preceding reference speed
fCarA = p_befCalculate->second.fCarA; // Acceleration
tmpCalcTime = p_befCalculate->second.nCalcTime;
befNegrevo = p_befCalculate->second.fNegrevo;

// -----
// Obtain acceleration for reaching this-time vehicle speed.
// -----
calcVana = p_first->second.fVref_sp;
fCarA = (( calcVana - tmpV ) / ( tmpCalcTime / 10.0 ) ) * 1000.0 / ( 60.0 * 60.0 );

nRet = GetNe( tmpGear, calcVana, tmpNegrevo ); // Obtains engine speed.
if( nRet == NG ){
    return(false);
}
// Shift-up if maximum engine speed criterion is exceeded.
if( tmpNegrevo >= fNeMaxTopLimit ){ // If engine speed is equal to or more than maximum engine
speed value
    return(false);
}
if( tmpNegrevo <= fNeMinLimit ){ // In case of min. engine speed or less
    return(false); // Does not execute shift-up.
}

nRet = GetTe_NotRevise( tmpGear, calcVana, fCarA, tmpNegrevo, fTe ); // Engine torque (without complement)

```

```

fTeMax = GetLineReviseMaxTorque(tmpNegrevo);
if( fTe > fTeMax ){
    if( tmpGear != OrgGear ){
        return(false);
    }
}

bRet = CalcTeMaxSp(tmpGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
if( bRet == false ){
    return( false );
}
fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
p_befCalculate->second.fCarA = fCarA;
p_first->second.fVana_sp = calcVana;

if( OrgGear != tmpGear ){
    calcVana = p_first->second.fVref_sp;
    fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
    bRet = CheckForce( tmpGear, calcVana, fCarA );
    if( bRet != true ){
        return(false);
    }
}

// -----
// Check for gear hold time
// -----
for( p_tmpCalculate = p_first;
      p_tmpCalculate != p_second;
      p_tmpCalculate++){
    p_befCalculate = p_tmpCalculate;
    p_befCalculate--;

    tmpV = p_befCalculate->second.fVana_sp;
    calcVana = p_tmpCalculate->second.fVref_sp;
    tmpCalcTime = p_befCalculate->second.nCalcTime;
    bRet = CalcTeMaxSp(tmpGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
    if( bRet == false ){
        return( false );
    }
    fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
    p_tmpCalculate->second.fVana_sp = calcVana;
    p_befCalculate->second.fCarA = fCarA;
    if( fCarA < 0 ){
        break;
    }

    // Shift-up if maximum engine speed criterion is exceeded.
    if(tmpNegrevo >= fNeMaxTopLimit){
speed value

```

```

// Linear interpolation
// Current status maintenance, shift-down

```

```

// Determines shift-up availability.
// If shift-up is unavailable

```

```

// All sections subject to determination
// Preceding speed
// Preceding analysis speed

```

```

// If engine speed is equal to or more than maximum engine

```

```

        return(false);
sets gear to top.))
    }
    if( tmpNegrevo <= fNeMinLimit){
        return(false);
    }

    if( OrgGear != tmpGear ){
        calcVana = p_tmpCalculate->second.fVref_sp;
        fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
        nRet = GetTe_NotRevise( tmpGear, calcVana, fCarA, tmpNegrevo, fTe);
        fTeMax = GetLineReviseMaxTorque(tmpNegrevo);
        if( fTe > fTeMax ){
            return(false);
        }
    }
}

if( bFlag == true ){
    bRet = true;
} else{
    bRet = false;
}

return(bRet);
}
/**/
/*****
* Function name      : Calculate_GearUp
* Function summary   : Acceleration T3 section confirmation processing
* Explanation        : Availability of running with applicable gear during acceleration
*                   : is checked.
* Argument (input)   : p_first  : First pointer
* Argument (input)   : p_second : Next setting pointer
* Argument (I/O)     : tmpGear  : Gear position
* Return value       : true : Maintaining OK    false : Maintaining NG
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool  TCalculateProc::Calculate_GearUp(map<double, stCalculateData>::iterator p_first,
                                     map<double, stCalculateData>::iterator p_second,
                                     double &fDiffDistance,
                                     int &tmpGear )
{
    map<double, stCalculateData>::iterator p_tmpCalculate;
    map<double, stCalculateData>::iterator p_befCalculate;
    map<int, double> mDiffDistance;
    map<int, double>::iterator p_DiffDistance;
    int    nRet;
// Executes shift-up. (Enables maintaining current status and
// In case of min. engine speed or less
// Does not execute shift-up.
// Engine torque (without complement)
// Linear interpolation
// If max. torque is exceeded
// If current status can be maintained by holding specified gear
// Temporary pointer
// Temporary pointer
// different reference speed data
// different reference speed data pointer
// Return value of function to be recalled

```

```

bool    bRet;
bool    bFlag;
int     OrgGear;
int     nSetGear;
int     nApdGear;
int     nNextGear;
double  fTe, fTeMax;
double  tmpNegrevo;
double  tmpV;
double  tmpVref_sp;
double  tmpCalcTime;
double  fNeMinLimit;
double  fNeMaxTopLimit;
double  befNegrevo;
double  fCarA;
double  calcVana;
stExceedForce tmpExceedForce;

OrgGear = tmpGear;
bFlag = true;
fDiffDistance = 0;

if( tmpGear > m_nMaxGear ){
    return(false);
}

// -----//
// Check with gear excess torque ratio.
// -----//
if( tmpGear + 3 > m_nMaxGear ){
    tmpGear = m_nMaxGear;
} else {
    tmpGear = tmpGear + 3;
}

for(;tmpGear >= OrgGear ; tmpGear-- ){
    // evolution arithmetic determination of lower limit
    memset( &tmpExceedForce, 0x00, sizeof( tmpExceedForce ));
    tmpExceedForce.nGear = tmpGear;
    fNeMinLimit = m_ExceedForce.find( tmpExceedForce )->fMinNe;
    fNeMaxTopLimit = m_fOutputRotation;

    p_befCalculate = p_first;
    p_befCalculate--;

    tmpV = p_befCalculate->second.fVana_sp;
    tmpVref_sp = p_befCalculate->second.fVref_sp;
    fCarA = p_befCalculate->second.fCarA;
    tmpCalcTime = p_befCalculate->second.nCalcTime;
    befNegrevo = p_befCalculate->second.fNegrevo;

    // Flag to determine whether current status can be maintained
    // Setting before gear position

    // Torque for calculation
    // Previous engine speed
    // Temporary speed
    // Temporary reference speed

    // Engine speed determination lower limit
    // Max. engine speed rate

    // Acceleration
    // Analysis speed for calculation
    // Structure for search

    // Current status maintain state flag

    // Searches for optimum gear in available range.
    // Initializes search structure.
    // Sets gear.
    // Sets lower-limit engine speed.

    // Preceding speed

    // Preceding analysis speed
    // Preceding reference speed
    // Acceleration

```

```

// -----
// Obtain acceleration for reaching this-time vehicle speed.
// -----
calcVana = p_first->second.fVref_sp;
fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);

nRet = GetNe( tmpGear, calcVana, tmpNegrevo); // Obtains engine speed.
if( nRet == NG ){
    return(false);
}
// Shift-up if maximum engine speed criterion is exceeded.
if(tmpNegrevo >= fNeMaxTopLimit){ // If engine speed is equal to or more than maximum engine
speed value
    continue;
}
if( tmpNegrevo <= fNeMinLimit){ // In case of min. engine speed or less
    continue; // Does not execute shift-up.
}

nRet = GetTe_NotRevise( tmpGear, calcVana, fCarA, tmpNegrevo, fTe); // Engine torque (without complement)
fTeMax = GetLineReviseMaxTorque(tmpNegrevo); // Linear interpolation
if( fTe > fTeMax ){ // Current status maintenance, shift-down
    if( tmpGear != OrgGear ){
        continue;
    }
}

bRet = CalcTeMaxSp(tmpGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
if( bRet == false ){
    return( false );
}
fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
p_befCalculate->second.fCarA = fCarA;
p_first->second.fVana_sp = calcVana;

if( OrgGear != tmpGear ){
    calcVana = p_first->second.fVref_sp;
    fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
    bRet = CheckForce( tmpGear, calcVana, fCarA ); // Determines shift-up availability.
    if( bRet != true ){ // If shift-up is unavailable
        continue;
    }
}

// -----
// Check for gear hold time
// -----
nSetGear = tmpGear;
nApdGear = tmpGear;
fDiffDistance = 0;
for( p_tmpCalculate = p_first;

```

```

        p_tmpCalculate != p_second;
        p_tmpCalculate++) { // All sections subject to determination
    p_befCalculate = p_tmpCalculate; // Preceding speed
    p_befCalculate--;
    tmpV = p_befCalculate->second.fVana_sp; // Preceding analysis speed
    calcVana = p_tmpCalculate->second.fVref_sp;
    tmpCalcTime = p_befCalculate->second.nCalcTime;
    bRet = CalcTeMaxSp(nApdGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
    if( bRet == false ){
        return( false );
    }
    fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
    p_tmpCalculate->second.fVana_sp = calcVana;
    p_befCalculate->second.fCarA = fCarA;
    if( fCarA < 0 ){
        break;
    }
    if( nApdGear != OrgGear ){
        // Shift-up if maximum engine speed criterion is exceeded.
        if(tmpNegrevo >= fNeMaxTopLimit){ // If engine speed is equal to or more than maximum engine
            nSetGear = 0; // Executes shift-up. (Enables maintaining current status and
            break;
        }
        if( tmpNegrevo <= fNeMinLimit){ // In case of min. engine speed or less
            nSetGear = 0; // Does not execute shift-up.
            break;
        }
    } else {
        if(tmpNegrevo >= fNeMaxTopLimit){ // If engine speed is equal to or more than maximum engine
            bRet = Calculate_RatedUp( p_tmpCalculate, p_second, nNextGear, nApdGear);
            if( bRet == true ){
                nApdGear = nNextGear;
                tmpV = p_befCalculate->second.fVana_sp; // Preceding analysis speed
                calcVana = p_tmpCalculate->second.fVref_sp;
                tmpCalcTime = p_befCalculate->second.nCalcTime;
                bRet = CalcTeMaxSp(nApdGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
                if( bRet == false ){
                    return( false );
                }
                fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
                p_tmpCalculate->second.fVana_sp = calcVana;
                p_befCalculate->second.fCarA = fCarA;
            }
        }
        if( tmpNegrevo <= fNeMinLimit){ // In case of min. engine speed or less

```

```

ConvertD_pub.cpp
bRet = Calculate_RatedDown( p_tmpCalculate, p_second, nNextGear, nApdGear);
if( bRet == true ){
    nApdGear = nNextGear;

    tmpV = p_befCalculate->second.fVana_sp; // Preceding analysis speed
    calcVana = p_tmpCalculate->second.fVref_sp;
    tmpCalcTime = p_befCalculate->second.nCalcTime;
    bRet = CalcTeMaxSp(nApdGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
    if( bRet == false ){
        return( false );
    }
    fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
    p_tmpCalculate->second.fVana_sp = calcVana;
    p_befCalculate->second.fCarA = fCarA;
}
}
}
fDiffDistance = fDiffDistance +
    (p_befCalculate->second.fVref_sp + p_tmpCalculate->second.fVref_sp)/(2*3.6) -
    (p_befCalculate->second.fVana_sp + p_tmpCalculate->second.fVana_sp)/(2*3.6);
}

if( nSetGear != 0 ){
    mDiffDistance.insert(pair<int,double>(nSetGear, fDiffDistance) ); // Sets analysis time in pattern information
}

if( mDiffDistance.empty() != true ){
    p_DiffDistance = mDiffDistance.begin();
    fDiffDistance = p_DiffDistance->second;
    nSetGear = p_DiffDistance->first;
    for( p_DiffDistance = mDiffDistance.begin();
        p_DiffDistance != mDiffDistance.end();
        p_DiffDistance++ ){
        if( fabs( p_DiffDistance->second ) <= fabs( fDiffDistance ) ){
            if( nSetGear < p_DiffDistance->first ){
                fDiffDistance = p_DiffDistance->second;
                nSetGear = p_DiffDistance->first;
            }
        }
    }
    mDiffDistance.erase( mDiffDistance.begin(), mDiffDistance.end() );
    mDiffDistance.clear();
} else {
    nSetGear = 0;
}

if( nSetGear == 0 ){
    tmpGear = OrgGear;
    bRet = false;
} else {

```



```

    tmpGear = nSetGear;
    if( fDiffDistance == 0 ){
        bRet = true;
    }else{
        bRet = false;
    }
}

return(bRet);
}
/**/
/*****
* Function name      : Calculate_MaxNeGearUp
* Function summary   : Acceleration T3 section confirmation processing
* Explanation        : Availability of running with applicable gear during acceleration
*                   : is checked.
* Argument (input)   : p_first  : First pointer
* Argument (input)   : p_second : Next setting pointer
* Argument (I/O)     : tmpGear  : Gear position
* Return value       : true : Maintaining OK   false : Maintaining NG
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCalculateProc::Calculate_MaxNeGearUp(map<double, stCalculateData>::iterator p_first,
                                           map<double, stCalculateData>::iterator p_second,
                                           int &tmpGear )
{
    map<double, stCalculateData>::iterator p_tmpCalculate; // Temporary pointer
    map<double, stCalculateData>::iterator p_befCalculate; // Temporary pointer
    map<int, double> mDiffDistance; // different reference speed data
    map<int, double>::iterator p_DiffDistance; // different reference speed data pointer
    int nRet; // Return value of function to be recalled
    bool bRet;
    bool bFlag; // Flag to determine whether current status can be maintained
    int OrgGear; // Setting before gear position
    int nSetGear;
    double fDiffDistance;
    double fTe, fTeMax; // Torque for calculation
    double tmpNegrevo; // Previous engine speed
    double tmpV; // Temporary speed
    double tmpVref_sp; // Temporary reference speed
    double tmpCalcTime;
    double fNeMinLimit; // Engine speed determination lower limit
    double fNeMaxTopLimit; // Max. engine speed rate
    double befNegrevo;
    double fCarA; // Acceleration
    double calcVana; // Analysis speed for calculation
    stExceedForce tmpExceedForce; // Structure for search
}

```

```

OrgGear = tmpGear;
bFlag = true; // Current status maintain state flag

if( tmpGear > m_nMaxGear ){
    return(false);
}

nSetGear = tmpGear;
for(;tmpGear <= m_nMaxGear ; tmpGear++){ // Searches for optimum gear in available range.
    // -----//
    // Check with gear excess torque ratio.
    // -----//
    if( tmpGear == OrgGear +3 +1 ){
        break;
    }

    // evolution arithmetic determination of lower limit
    memset( &tmpExceedForce, 0x00, sizeof( tmpExceedForce ) ); // Initializes search structure.
    tmpExceedForce.nGear = tmpGear; // Sets gear.
    fNeMinLimit = m_ExceedForce.find( tmpExceedForce )->fMinNe; // Sets lower-limit engine speed.
    fNeMaxTopLimit = m_fOutputRotation;

    p_befCalculate = p_first;
    p_befCalculate--; // Preceding speed

    tmpV = p_befCalculate->second.fVana_sp; // Preceding analysis speed
    tmpVref_sp = p_befCalculate->second.fVref_sp; // Preceding reference speed
    fCarA = p_befCalculate->second.fCarA; // Acceleration
    tmpCalcTime = p_befCalculate->second.nCalcTime;
    befNegrevo = p_befCalculate->second.fNegrevo;

    // -----//
    // Obtain acceleration for reaching this-time vehicle speed.
    // -----//
    calcVana = p_first->second.fVref_sp;
    fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);

    nRet = GetNe( tmpGear, calcVana, tmpNegrevo); // Obtains engine speed.
    if( nRet == NG ){
        return(false);
    }
    // Shift-up if maximum engine speed criterion is exceeded.
    if(tmpNegrevo >= fNeMaxTopLimit){ // If engine speed is equal to or more than maximum engine
speed value
        continue;
    }
    if( tmpNegrevo <= fNeMinLimit){ // In case of min. engine speed or less
        continue; // Does not execute shift-up.
    }
}

```

```

bRet = CalcTeMaxSp(tmpGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
if( bRet == false ){
    return( false );
}
fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
p_befCalculate->second.fCarA = fCarA;
p_first->second.fVana_sp = calcVana;
if(tmpNegrevo >= fNeMaxTopLimit){ // If engine speed is equal to or more than maximum engine
speed value
    continue;
}

// -----
// Check for gear hold time
// -----
nSetGear = tmpGear;
fDiffDistance = 0;
for( p_tmpCalculate = p_first;
      p_tmpCalculate != p_second;
      p_tmpCalculate++){ // All sections subject to determination
    p_befCalculate = p_tmpCalculate; // Preceding speed
    p_befCalculate--; // Preceding analysis speed

    tmpV = p_befCalculate->second.fVana_sp;
    calcVana = p_tmpCalculate->second.fVref_sp;
    tmpCalcTime = p_befCalculate->second.nCalcTime;
    bRet = CalcTeMaxSp(tmpGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
    if( bRet == false ){
        return( false );
    }
    fCarA = (( calcVana - tmpV) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
    p_tmpCalculate->second.fVana_sp = calcVana;
    p_befCalculate->second.fCarA = fCarA;
    if( fCarA < 0 ){
        break;
    }

    // Shift-up if maximum engine speed criterion is exceeded.
    if(tmpNegrevo >= fNeMaxTopLimit){ // If engine speed is equal to or more than maximum engine
speed value
        nSetGear = 0; // Executes shift-up. (Enables maintaining current status and
sets gear to top.))
        break;
    }
    if( tmpNegrevo <= fNeMinLimit){ // In case of min. engine speed or less
        nSetGear = 0; // Does not execute shift-up.
        break;
    }
    fDiffDistance = fDiffDistance +
        (p_befCalculate->second.fVref_sp + p_tmpCalculate->second.fVref_sp)/(2*3.6) -
        (p_befCalculate->second.fVana_sp + p_tmpCalculate->second.fVana_sp)/(2*3.6);

```

```

    }
    if( nSetGear != 0 ){
        mDiffDistance.insert(pair<int,double>(nSetGear, fDiffDistance) );           // Sets analysis time in pattern information
    }
}

if( mDiffDistance.empty() != true ){
    p_DiffDistance = mDiffDistance.begin();
    fDiffDistance = p_DiffDistance->second;
    nSetGear = p_DiffDistance->first;
    for( p_DiffDistance = mDiffDistance.begin();
        p_DiffDistance != mDiffDistance.end();
        p_DiffDistance++ ){
        if( fabs( p_DiffDistance->second ) <= fabs( fDiffDistance ) ){
            if( fabs( p_DiffDistance->second ) == fabs( fDiffDistance ) ){
                if( nSetGear > p_DiffDistance->first ){
                    fDiffDistance = p_DiffDistance->second;
                    nSetGear = p_DiffDistance->first;
                }
            }
            }else{
                fDiffDistance = p_DiffDistance->second;
                nSetGear = p_DiffDistance->first;
            }
        }
    }
    mDiffDistance.erase( mDiffDistance.begin(), mDiffDistance.end() );
    mDiffDistance.clear();
}
else{
    nSetGear = 0;
}

if( nSetGear == 0 ){
    tmpGear = OrgGear;
    bRet = false;
}
else{
    tmpGear = nSetGear;
    bRet = true;
}

return(bRet);
}
/**/
/*****
* Function name      : Calculate_TeMinGear
* Function summary   : Min. normal engine speed gear setting
* Explanation        : Until min. normal engine speed (min. engine speed) is reached
*                    : gear is shifted down.
* Argument (input)   : p_first : First pointer

```

```

* Argument (input)      : between ChangePos + hold Time
* Argument (output)    : None
* Argument (I/O)       : nGear : Gear position
* Return value         :
* Created by           :
* Updated on (created on) :
* Remarks              :
*****/
bool TCalculateProc::Calculate_TeMinGear(map<double, stCalculateData>::iterator p_first, int nPos, int &nGear )
{
    map<double, stCalculateData>::iterator p_befCalculate; // Temporary pointer
    map<double, stCalculateData>::iterator p_tmpCalculate; // Temporary pointer
    map<double, stCalculateData>::iterator p_second;
    map<int, double> mDiffDistance; // diffrent reference speed data
    map<int, double>::iterator p_DiffDistance; // diffrent reference speed data pointer
    stExceedForce tmpExceedForce; // Structure for search
    stCalculateData tmpCalculateData; // Temporary analysis data
    int nRet;
    bool bRet;
    double fNeMinLimit; // Engine speed determination lower limit
    double tmpNegrevo; // Previous engine speed
    double tmpV; // Temporary speed
    double tmpVref_sp; // Temporary reference speed
    double fCarA; // Acceleration data for calculation result
    double calcVana; // Speed data for calculation
    double tmpCalcTime;
    double fDiffDistance;
    int nOrgGear;
    int nSetGear;

    if( nGear < m_nInitGear ){
        nGear = m_nInitGear;
    }
    nOrgGear = nGear;
    nSetGear = 0;

    p_befCalculate = p_first;
    p_befCalculate--; // Preceding speed

    tmpV = p_befCalculate->second.fVana_sp; // Preceding analysis speed
    tmpVref_sp = p_befCalculate->second.fVref_sp; // Preceding reference speed
    fCarA = p_befCalculate->second.fCarA; // Acceleration
    tmpCalcTime = p_befCalculate->second.nCalcTime;
    calcVana = tmpV + fCarA * tmpCalcTime /10.0 * 3.6; // Analysis vehicle speed

    tmpCalculateData.fTimes = p_first->second.fTimes + (m_fTg - nPos)* 10.0; // End of gear keep point
    p_second = setCalculateData.find( tmpCalculateData.fTimes );

    for( ; nGear >= m_nInitGear; nGear-- ){
        memset( &tmpExceedForce, 0x00, sizeof( tmpExceedForce ) ); // Initializes search structure.
        tmpExceedForce.nGear = nGear; // Sets gear.
    }
}

```

```

fNeMinLimit = m_ExceedForce.find( tmpExceedForce )->fMinNe; // Sets lower-limit engine speed.

calcVana = p_first->second.fVref_sp;
bRet = CalcTeMaxSp(nGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
if( bRet == false ){
    return( false );
}
fCarA = (( calcVana - tmpV ) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
p_befCalculate->second.fCarA = fCarA;
p_first->second.fVana_sp = calcVana;

if( tmpNegrevo > fNeMinLimit){ // In case of more than min. engine speed
    calcVana = p_first->second.fVref_sp;
    fCarA = (( calcVana - tmpV ) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
    nRet = GetNe( nGear, calcVana, tmpNegrevo ); // Obtains engine speed.
    if( nRet != OK ){
        break;
    }

    nSetGear = nGear;
    fDiffDistance = 0.0;

    for( p_tmpCalculate = p_first;
        p_tmpCalculate != p_second;
        p_tmpCalculate++){ // All sections subject to determination
            p_befCalculate = p_tmpCalculate; // Preceding speed
            p_befCalculate--; // Preceding analysis speed

            tmpV = p_befCalculate->second.fVana_sp;
            calcVana = p_tmpCalculate->second.fVref_sp;
            tmpCalcTime = p_befCalculate->second.nCalcTime;
            bRet = CalcTeMaxSp(nSetGear, (tmpCalcTime / 10.0), tmpV, calcVana, tmpNegrevo );
            if( bRet == false ){
                return( false );
            }
            fCarA = (( calcVana - tmpV ) / (tmpCalcTime / 10.0)) * 1000.0/(60.0*60.0);
            p_tmpCalculate->second.fVana_sp = calcVana;
            p_befCalculate->second.fCarA = fCarA;
            if( fCarA < 0 ){
                if( p_tmpCalculate == p_first ){
                    nSetGear = 0;
                }
                break;
            }
        }

        if( nOrgGear != nSetGear ){
            // Shift-up if maximum engine speed criterion is exceeded.
            if(tmpNegrevo >= m_fOutputRotation){ // If engine speed is equal to or more than maximum engine
                nSetGear = 0;
                break;
            }
        }
    }

```

speed value

```

    }
    }
    fDiffDistance = fDiffDistance +
        (p_befCalculate->second.fVref_sp + p_tmpCalculate->second.fVref_sp)/(2*3.6) -
        (p_befCalculate->second.fVana_sp + p_tmpCalculate->second.fVana_sp)/(2*3.6);
}
if( nSetGear != 0 ){
    mDiffDistance.insert(pair<int,double>(nSetGear, fDiffDistance) );           // Sets analysis time in pattern information
}
}

if( mDiffDistance.empty() != true ){
    p_DiffDistance = mDiffDistance.begin();
    fDiffDistance = p_DiffDistance->second;
    nSetGear = p_DiffDistance->first;
    for( p_DiffDistance = mDiffDistance.begin();
        p_DiffDistance != mDiffDistance.end();
        p_DiffDistance++ ){
        if( fabs( p_DiffDistance->second ) <= fabs( fDiffDistance ) ){
            if( fabs( p_DiffDistance->second ) == fabs( fDiffDistance ) ){
                if( nSetGear < p_DiffDistance->first ){
                    fDiffDistance = p_DiffDistance->second;
                    nSetGear = p_DiffDistance->first;
                }
            }else{
                fDiffDistance = p_DiffDistance->second;
                nSetGear = p_DiffDistance->first;
            }
        }
    }
    mDiffDistance.erase( mDiffDistance.begin(), mDiffDistance.end() );
    mDiffDistance.clear();
}
else{
    nSetGear = 0;
}

if( nSetGear == 0 ){
    nGear = nOrgGear;
    bRet = false;
}
else{
    nGear = nSetGear;
    bRet = true;
}

return(bRet);
}
/**/
/*****
* Function name      : Calculate_T6Set
* Function summary   : Deceleration T6 section setup processing

```

```

* Explanation      : Detailed settings are made for deceleration.
*
* Argument (input) : p_first  : First pointer
* Argument (input) : p_second : Next setting pointer
* Argument (output): None
* Argument (1/0)   : None
* Return value     : true : Normal   false : Failure
* Created by       :
* Updated on (created on) :
* Remarks          :
*****/
bool TCalculateProc::Calculate_T6Set(map<double, stCalculateData>::iterator p_first,
                                     map<double, stCalculateData>::iterator p_second )
{
    map<double, stCalculateData>::iterator p_tmpCalculate; // Temporary pointer
    map<double, stCalculateData>::iterator p_Set;         // Temporary repeat data
    map<double, stCalculateData>::iterator p_Next;        // Temporary repeat data (next pointer)
    map<double, stCalculateData>::iterator p_betwn;       // Identifies pointers before and after.
    map<double, stCalculateData>::iterator p_before;      // Previous data
    int nRet; // Return value of function to be recalled
    int tmpNowGear; // Temporary gear
    double tmpVana_sp; // Previous analysis speed
    double tmpNegrevo; // Previous engine speed
    double tmpGearTime; // Gear required time
    double tmpCalcTime; // Required time
    double fBeforeA; // Previous acceleration

    p_tmpCalculate = p_first;
    p_tmpCalculate--; // Sets preceding data point.

    tmpNowGear = p_tmpCalculate->second.nGear; // Sets preceding gear.
    tmpVana_sp = p_tmpCalculate->second.fVana_sp; // Previous analysis speed
    fBeforeA = p_tmpCalculate->second.fCarA; // Previous reference acceleration
    tmpGearTime = p_tmpCalculate->second.nGearTime; // Sets gear hold time.
    tmpCalcTime = p_tmpCalculate->second.nCalcTime; // Sets required time.
    // -----
    // Temporarily apply current gear to all processing steps.
    // -----
    for (; p_tmpCalculate != p_second; p_tmpCalculate++) {
        p_tmpCalculate->second.nGear = tmpNowGear; // Sets current gear.
    }

    // -----
    // Determine engine speed availability with current gear.
    // -----
    for ( p_tmpCalculate = p_first;
          p_tmpCalculate != p_second;
          p_tmpCalculate++) {
        if ( p_tmpCalculate->second.nGear == 0 ) { // All sections subject to determination
            continue; // Check in case of gear being activated
        }
    }
}

```



```

}

if( p_tmpCalculate != p_first ){
    p_before = p_tmpCalculate;
    p_before--;
    tmpGearTime = p_before->second.nGearTime;
    tmpCalcTime = p_before->second.nCalcTime;
    fBeforeA = p_before->second.fCarA;
    tmpVana_sp = p_before->second.fVana_sp;
    tmpNowGear = p_before->second.nGear;
}

nRet = GetNe( p_tmpCalculate->second.nGear, tmpVana_sp, tmpNegrevo );
if (nRet != OK) return( false );

// -----
// Make settings for shift-down T6 section.
// -----
p_tmpCalculate->second.nGearTime = (int)tmpGearTime + (int)tmpCalcTime;
// Set analysis speed (temporarily).
p_tmpCalculate->second.fVana_sp = tmpVana_sp +
    fBeforeA * tmpCalcTime /10.0 * 3.6;

}

// -----
// Calculate acceleration again.
// -----
BtwnCarASet(p_first, p_second);

return( true );
}

/**/
// #####
// -----
// Calculation processing starts here.
// -----
// #####

/**/
/*****
* Function name      : CalcRL
* Function summary   : Rolling resistance calculation processing
* Explanation        : Rolling resistance is calculated.
*
* Argument (input)   : fV : Vehicle speed
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : double Rolling resistance value
* Created by         :
* Updated on (created on) :
* Remarks            :

```

```

*****/
double TCalculateProc::CalcRL(double fV)
{
    string szData, szKey;
    double fCarM;
    double fRL;
    double fCarB, fCarH;

    // Read and calculate weight data.
    fCarM = GetCarWeight(false);
    fCarB = m_fOverWidth; // Car width
    fCarH = m_fOverHeight; // Car height
    fRL = ((double)((0.00513 + 17.6/fCarM) * fCarM) +
           ((double)((0.00299 * fCarB * fCarH - 0.000832)) * (fV * fV)));
    return( fRL );
}
/**/
*****/
* Function name      : GetCarWeight
* Function summary   : Curb vehicle weight data calculation processing
* Explanation        : Curb vehicle weight is calculated.
*
* Argument (input)   : bFlag : If true, equivalent rotational inertia mass ratio is included, and not included if false.
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : double Curb vehicle weight value
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
double TCalculateProc::GetCarWeight(bool bFlag, int nGear)
{
    double fW;
    double fGearHi;

    if (bFlag) {
        GetGearHi(nGear, fGearHi);
        fW = m_fCarMe +
            m_fCarMe * m_fMFact +
            m_fCarMe * m_fEFact * fGearHi*fGearHi +
            m_fCarMc +
            m_fPersonW;
    } else {
        fW = m_fCarMc + m_fCarMe + m_fPersonW;
    }
    return( fW );
}
/**/
*****/
* Function name      : GetGearHi
* Function summary   : Gear ratio acquisition processing

```

```

* Explanation      : Gear ratio is obtained from gear position.
*
* Argument (input) : nGear   : Gear position
* Argument (output): fGearHi  : Gear ratio
* Argument (I/O)   : None
* Return value     : OK : Normal   NG : Failure
* Created by       :
* Updated on (created on) :
* Remarks          :
*****/
int TCalculateProc::GetGearHi(int nGear, double &fGearHi)
{
    if( m_fGearHi.empty() == true ){
        fGearHi = 1;
        return( NG );
    }

    if( nGear > (int)(m_fGearHi.size()) ){
        fGearHi = 1;
        return( NG );
    }

    fGearHi = m_fGearHi[nGear-1];

    return( OK );
}
/**/
*****/
* Function name      : GetGearHiN
* Function summary   : Gear ratio acquisition (including final reduction ratio)
* Explanation        : Gear ratio including final reduction ratio is obtained
*                    : from gear position.
* Argument (input)   : nGrear  : Gear position
* Argument (output)  : fGearti  : Gear ratio
* Argument (I/O)     : None
* Return value       : OK : Normal   NG : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
int TCalculateProc::GetGearHiN(int nGrear, double &fGearti)
{
    int      nRet;
    string    szKey;
    string    sznGearData;
    double    fnGearData, fLastReduceGear;

    // n'th-gear ratio data

    // n'th-gear ratio
    nRet = GetGearHi( nGrear, fnGearData );

```

```

    if( nRet != OK ){
        return( NG );
    }

    fLastReduceGear = m_fLastReduceGear;
    fGearti = fnGearData * fLastReduceGear;

    return( OK );
}
/**/
/*****
* Function name      : GetNe
* Function summary   : Engine speed calculation processing
* Explanation        : Engine speed is calculated.
*
* Argument (input)   : nGear : Gear position
* Argument (input)   : fVg  : Vehicle speed (Vg)
* Argument (output)  : fNe   : Engine speed
* Argument (I/O)     : None
* Return value       : OK : Normal   NG : Failure
* Created by         :
* Updated on (created on) :
* Remarks           :
*****/
int TCalculateProc::GetNe( int nGear, double fVg, double &fNe)
{
    string szKey, szData;
    int nRet;
    double fGearti;
    double fTarR; // Tire rolling radius data

    fTarR = m_fTarR; // Tire rolling radius
    nRet = GetGearIN(nGear, fGearti);
    if (nRet != OK) return( NG );

    fNe = fVg / 60.0 * fGearti * 1000.0 / (2.0 * CalculateProc->m_fPAI*fTarR);
    return( OK );
}
/**/
/*****
* Function name      : GetV
* Function summary   : Speed calculation processing
* Explanation        : Speed is calculated.
*
* Argument (input)   : nGear : Gear position
* Argument (input)   : fNe   : Engine speed
* Argument (output)  : fVg   : Vehicle speed (Vg)
* Argument (I/O)     : None
* Return value       : OK : Normal   NG : Failure
* Created by         :
* Updated on (created on) :
*****/

```

```

* Remarks          :
*****/
int  TCalculateProc::GetV( int nGear, double fNe, double &fVg)
{
    string szKey, szData;
    int    nRet;
    double fGearti;
    double fTarR; // Tire rolling radius data

    fTarR = m_fTarR; // Tire rolling radius
    nRet = GetGearIN(nGear, fGearti);
    if (nRet != OK) return( NG );

    fVg = fNe * 60.0 / fGearti / 1000.0 * (2.0 * CalculateProc->m_fPAI*fTarR);
    return( OK );
}
/**/
*****/
* Function name      : GetTe
* Function summary   : Torque calculation processing
* Explanation        : Torque is calculated. However, interpolation data is
*                   : considered.
* Argument (input)   : nGear : Gear position
* Argument (input)   : fV    : Vehicle speed (fV)
* Argument (input)   : fA    : Acceleration for fV
* Argument (input)   : fNe   : Engine speed
* Argument (output)  : fTe   : Torque
* Argument (I/O)     : None
* Return value       : OK : Normal   NG : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
int  TCalculateProc::GetTe( int nGear, double fV, double fA, double fNe, double &fTe)
{
    string szKey, szData;
    int    nRet;
    double fnGearPass; // n'th-gear ratio (transmission efficiency) data
    double fTarR; // Tire rolling radius data
    double fCarMt; // Vehicle body weight
    double fKg ; // Gravitational acceleration
    double fGearti, fRL;
    double fUd; // Transmission efficiency of final speed reducer
    double tmpTe;

    // Gravitational acceleration
    nRet = GetKG(fKg);
    if (nRet != OK) return( NG );

    // Vehicle body weight
    fCarMt = GetCarWeight(true, nGear);

```

```

// Obtain gear transmission efficiency.
fnGearPass = GetGearPass(nGear);

nRet = GetGearIN(nGear, fGearti);
if(nRet == NG) {
    return( NG );
}

fRL = CalcRL(fV);
// Tire rolling radius data

fTarR = m_fTarR;
// Final reduction ratio (transmission efficiency)
fUd = m_fUd;

// Engine torque  $T_e = \{(M_t * \text{Alfa} / g) + RL\} * (1000 * rd) / (G_{ti} * U_t)$ 
fTe = ((fKg*fTarR)/( fGearti * fnGearPass * fUd))*( fRL + (fCarMt / fKg) * fA );

tmpTe = GetLineReviseMaxTorque(fNe);
if(( fNe > 0 )&&( fTe > tmpTe )){
    if( tmpTe != 0.0 ){
        fTe = tmpTe;
    }
}
// Linear interpolation
// If max. torque is exceeded

return( OK );
}
/**/
*****
* Function name      : GetTe_NotRevise
* Function summary   : Torque calculation processing (no correction)
* Explanation        : Torque is calculated.
*
* Argument (input)   : nGear : Gear position
* Argument (input)   : fV    : Vehicle speed (fV)
* Argument (input)   : fA    : Acceleration for fV
* Argument (input)   : fNe   : Engine speed
* Argument (output)  : fTe   : Torque
* Argument (I/O)     : None
* Return value       : OK : Normal   NG : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
int TCalculateProc::GetTe_NotRevise( int nGear, double fV, double fA, double fNe, double &fTe)
{
    string szKey, szData;
    int nRet;
    double fnGearPass;
    double fTarR;
// n'th-gear ratio (transmission efficiency) data
// Tire rolling radius data

```

```

double fCarMt; // Vehicle body weight
double fKg ; // Gravitational acceleration
double fGearti, fRL;
double fUd; // Transmission efficiency of final speed reducer

// Gravitational acceleration
nRet = GetKG(fKg);
if (nRet != OK) return( NG );

// Vehicle body weight
fCarMt = GetCarWeight(true, nGear);

// Obtain gear transmission efficiency.
fnGearPass = GetGearPass(nGear);

nRet = GetGearIN(nGear, fGearti);
if(nRet == NG){
    return( NG );
}

fRL = CalcRL(fV);
// Tire rolling radius data

fTarR = m_fTarR;
// Final reduction ratio (transmission efficiency)
fUd = m_fUd;

// Engine torque  $T_e = (M_t * \text{Alfa} / g + R_L) * (1000 * r_d) / (G_{ti} * U_t)$ 
fTe = ((fKg*fTarR)/( fGearti * fnGearPass * fUd))*( fRL + (fCarMt / fKg) * fA );

return( OK );
}
/**/
/*****
* Function name : GetCalculateDataFileName
* Function summary : Output file name acquisition processing
* Explanation : Output file name is set.
*
* Argument (input) : None
* Argument (output) : szFile : Output file name
* Argument (I/O) : None
* Return value :
* Created by :
* Updated on (created on) :
* Remarks :
*****/
void TCalculateProc::GetCalculateDataFileName(string & szFile )
{
    string szName, szExt;
    string szData;
    string szCurrentDateTime;

```

```

    szFile = m_OutputData;
    if( szFile == "" ){
        cerr << "Please, type output filename=";
        cin >> szFile;
    }

    return;
}
/**/
/*****
* Function name      : DispCalculateData
* Function summary   : Processing for parameter display during processing
* Explanation        : Specification data from read file is
*                   : displayed on screen.
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       :
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
void TCalculateProc::DispCalculateData(void)
{
    set<stExceedForce>::iterator p_ExceedForce; // Excess force ratio data
    char buf[256];
    double fCarM;
    double fGVWCarM;
    double fDW;

    fGVWCarM = m_fCarMaxW + m_fCarIniW + (m_fPersonW * m_fPersons);
    fCarM = GetCarWeight(false);

    sprintf( buf, " GVW  =%8.2f[kg]¥n", fGVWCarM );
    cout << buf;
    sprintf( buf, " WO   =%8.2f[kg], Wtest =%8.2f[kg]¥n", m_fCarIniW , fCarM );
    cout << buf;
    sprintf( buf, " Width =%8.3f[m], Height=%8.3f[m], Tire radius=%8.3f[m]¥n",
              m_fOverWidth,
              m_fOverHeight,
              m_fTarR );
    cout << buf;
    sprintf( buf, " Crew  =%3d¥n", (int)(m_fPersons) );
    cout << buf;
    sprintf( buf, "¥n" );
    cout << buf;
    sprintf( buf, " Nidle =%8.2f[rpm], Nrate =%8.2f[rpm], Nex  =%8.2f[rpm]¥n",
              m_fIdleNe,
              m_fRatedOutputRotation,

```



```

        m_fOutputRotation );
cout << buf;
sprintf( buf, " Nes  =%8.2f[rpm], Nec  =%8.2f[rpm]¥n",
        m_fClutch_MeetNe,
        m_fClutch_ReleaseNe );

cout << buf;
sprintf( buf, " MuAir =%10.6f [kgf/(km/h)^2], MuRoll =%10.6f [kgf/kg]¥n",
        (0.00299 * m_fOverWidth * m_fOverHeight - 0.000832),
        (0.00513 + 17.6/fCarM) );

cout << buf;
sprintf( buf, "¥n" );
cout << buf;
sprintf( buf, " Number of gear = %2d¥n", m_nMaxGear );
cout << buf;
sprintf( buf, " gear  ratio efficiency torq margin  DW[kg]¥n");
cout << buf;

for( p_ExceedForce = m_ExceedForce.begin();
    p_ExceedForce != m_ExceedForce.end();
    p_ExceedForce++ ) {
    fDW = (m_fMFact + m_fEFact * p_ExceedForce->fGearti * p_ExceedForce->fGearti) * m_fCarIniW;
    sprintf( buf, " %3d:  %6.3f  %6.3f  %6.3f  %12.5f ¥n",
            p_ExceedForce->nGear,
            p_ExceedForce->fGearti,
            p_ExceedForce->fForcePer,
            p_ExceedForce->fFreePer,
            fDW );
    cout << buf;
}
sprintf( buf, " fin:  %6.3f  %6.3f¥n", m_fLastReduceGear, m_fUd );
cout << buf;
sprintf( buf, "¥n" );
cout << buf;
}
/**/
/*****
* Function name      : WriteAllCalculateData
* Function summary   : Processed data output processing
* Explanation        : Processing result is output to file.
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : OK : Normal   NG : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
int TCalculateProc::WriteAllCalculateData()
{

```

```

string      szTmp, szFile;
int         nRet;
char       buf[1024];
FILE       *m_pFile;
double     fMaxTe;
bool       tmpbTe_f;
bool       tmpbN_norm_f;
bool       tmpbT_norm_f;
double     tmpfVref;
double     tmpfVana;
double     tmpfNe;
double     tmpfTe;
double     tmpN_norm;
double     tmpT_norm;
char       tmp_strfTe[128];
char       tmp_strfNe[128];
char       tmp_strN_norm[128];
char       tmp_strT_norm[128];

GetCalculateDataFileName(szFile);

if( ( m_pFile = fopen( szFile.c_str(), "wt" ) ) == NULL ){
    sprintf( buf, "%s\n\nThe file is not found.",
            szFile.c_str() );
    cout << buf << endl;
    return( NG );
}

nRet = WriteHead(m_pFile);
if (nRet != OK){
    return( NG );
}

for( p_setCalculateData = setCalculateData.begin();
    p_setCalculateData != setCalculateData.end();
    p_setCalculateData++ ){
    if( p_setCalculateData->second.nWriteFlg != 1 ){
        continue;
    }
    fMaxTe = GetLineReviseMaxTorque(p_setCalculateData->second.fNegrevo);

    tmpfTe = p_setCalculateData->second.fTe;
    tmpN_norm = ((p_setCalculateData->second.fNegrevo - m_fIdleNe)/( m_fFixedNe - m_fIdleNe )) * 100.0);
    if( fMaxTe <= 0 ){
        tmpT_norm = 0;
    }else{
        tmpT_norm = ((p_setCalculateData->second.fTe / fMaxTe) * 100.0);
    }

    tmpbTe_f = false;
    tmpbN_norm_f = false;
}

```

```

tmpbT_norm_f = false;
if( tmpfTe < 0 ){
    tmpbTe_f = true;
}
if( tmpN_norm < 0 ){
    tmpbN_norm_f = true;
}
if( tmpT_norm < 0 ){
    tmpbT_norm_f = true;
}

tmpfVref = p_setCalculateData->second.fVref_sp;
tmpfVana = p_setCalculateData->second.fVana_sp;
tmpfNe    = p_setCalculateData->second.fNegrevo;

if( tmpbTe_f == false ){
    sprintf( tmp_strfTe, "%f", tmpfTe );
    tmp_strfTe[strlen(tmp_strfTe)-1] = 0x00;
    tmpfTe = atof( tmp_strfTe );
    sprintf( tmp_strfTe, "%.1f", tmpfTe );
} else {
    sprintf( tmp_strfTe, "%s", "M" );
}
sprintf( tmp_strfNe, "%f", tmpfNe );
tmp_strfNe[strlen(tmp_strfNe)-1] = 0x00;
tmpfNe = atof( tmp_strfNe );
sprintf( tmp_strfNe, "%.1f", tmpfNe );
if( tmpbN_norm_f == false ){
    sprintf( tmp_strN_norm, "%.2f", tmpN_norm );
} else {
    sprintf( tmp_strN_norm, "%s", "M" );
}
if( tmpbT_norm_f == false ){
    sprintf( tmp_strT_norm, "%.2f", tmpT_norm );
} else {
    sprintf( tmp_strT_norm, "%s", "M" );
}

sprintf( buf, "%d¥t%. 2f¥t%. 2f¥t¥s¥t¥s¥t¥s¥t¥s¥t¥s¥t¥d",
        (int) (p_setCalculateData->second.fTimes / 10),
        tmpfVref,
        tmpfVana,
        tmp_strfNe,
        tmp_strfTe,
        tmp_strN_norm,
        tmp_strT_norm,
        p_setCalculateData->second.nGear );
// Accumulated time
// Reference vehicle speed
// Analysis vehicle speed
// Engine speed
// Engine torque

// Gear position

nRet = fprintf(m_pFile, "%s¥n", buf);
if (nRet == EOF) {
    fclose(m_pFile);
}

```

```

        cout << MSG_WRITE_FILE_ERROR << endl;
        return( NG );
    }
}

fclose(m_pFile);
return( OK );
}
/**/
/*****
* Function name      : WriteHead
* Function summary   : Analysis data header output processing
* Explanation        : Header is output to processing result file.
*
* Argument (input)   : *fp : Analysis data output file name
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : OK : Normal   NG : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
int TCalculateProc::WriteHead(FILE *fp)
{
    int nRet;
    string szFieldTitle;

    szFieldTitle = DEF_PRINT_POS1;
    szFieldTitle = szFieldTitle + "%t" + DEF_PRINT_POS2;
    szFieldTitle = szFieldTitle + "%t" + DEF_PRINT_POS3;
    szFieldTitle = szFieldTitle + "%t" + DEF_PRINT_POS4;
    szFieldTitle = szFieldTitle + "%t" + DEF_PRINT_POS5;
    szFieldTitle = szFieldTitle + "%t" + DEF_PRINT_POS6;
    szFieldTitle = szFieldTitle + "%t" + DEF_PRINT_POS7;
    szFieldTitle = szFieldTitle + "%t" + DEF_PRINT_POS8;

    nRet = fprintf(fp, "%s\n", szFieldTitle.c_str());
    if (nRet == EOF) {
        cout << MSG_WRITE_FILE_ERROR << endl;
        return( NG );
    }

    return( OK );
}

/**/
/*****
* Function name      : TCommFun
* Function summary   : Constructor

```

```

* Explanation      : Class constructor
*
* Argument (input) : None
* Argument (output): None
* Argument (I/O)   : None
* Return value     : None
* Created by       :
* Updated on (created on) :
* Remarks          :
*****/
TCommFun::TCommFun()
{

}

/**/
/*****
* Function name      : ~TCommFun
* Function summary   : Destructor
* Explanation        : Class destructor
*
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : None
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
TCommFun::~TCommFun()
{

}

/**/
/*****
* Function name      : AStrToDouble
* Function summary   : Comparison of two floating point values
* Explanation        : Character string numeric is converted to floating point numeric.
*
* Argument (input)   : szData : Character string numeric
* Argument (output)  : fData  : Floating point
* Argument (I/O)     : None
* Return value       : true : Normal   false : Failure
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCommFun::AStrToDouble(string szData, double &fData)
{

    try

```

```

{
    Trim(szData);
    if (!szData.empty())
    {
        fData = atof(szData.c_str());
    }else
    {
        return false;
    }
    return true;
}

catch (...)
{
    return false;
}

}
/**/
/*****
* Function name      : Trim
* Function summary   : Character string truncation
* Explanation        : Character string numeric is converted to floating point numeric.
*                    :
*                    :
* Argument (input)   : None
* Argument (output)  : None
* Argument (I/O)     : str : Character string truncated/to be truncated
* Return value       : None
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
void TCommFun::Trim( string &str )
{
    string tmpStr;
    int first_wd;
    int last_wd;

    //-----
    // Remove space.
    //-----
    first_wd = (int)(str.find_first_not_of(' ', 0));
    last_wd = (int)(str.find_last_not_of(' ', str.size()));

    tmpStr = str;
    if(( first_wd >= 0 )&&( last_wd >= 0 )&&( first_wd < last_wd )&&
        ( last_wd < (int)(str.size()) )){
        tmpStr = str.substr( first_wd, last_wd - first_wd +1);
    }

    str = tmpStr;
}

```

```

//-----
// Remove TAB.
//-----
first_wd = (int)(str.find_first_not_of( '\t', 0 ));
last_wd = (int)(str.find_last_not_of( '\t', str.size() ));

tmpStr = str;
if(( first_wd >= 0 )&&( last_wd >= 0 )&&( first_wd < last_wd )&&
( last_wd < (int)(str.size() ) )){
    tmpStr = str.substr( first_wd, last_wd - first_wd +1 );
}

str = tmpStr;

//-----
// Remove line feed.
//-----
first_wd = 0;
last_wd = (int)(str.find_last_not_of( '\n', str.size() ));

tmpStr = str;
if(( first_wd >= 0 )&&( last_wd >= 0 )&&( first_wd < last_wd )&&
( last_wd < (int)(str.size() ) )){
    tmpStr = str.substr( first_wd, last_wd - first_wd +1 );
}

str = tmpStr;
}
/**/
/*****
* Function name      : FileExists
* Function summary   : File confirmation processing
* Explanation        : Existence of specified file is checked.
*
* Argument (input)   : filename : File to be checked
* Argument (output)  : None
* Argument (I/O)     : None
* Return value       : true : Existing   false : Non-existing
* Created by         :
* Updated on (created on) :
* Remarks            :
*****/
bool TCommFun::FileExists( string filename )
{
    FILE *fp;

    fp = fopen( filename.c_str(), "r");
    if(( fp == NULL )||( ferror(fp) )){
        cout << "File Not Found. [" << filename << "]" << endl;
        return(false);
    }
}

```

```

    }
    fclose(fp);
    return(true);
}

```

```

/**/

```

```

/*****
 * Function name      : main
 * Function summary   : Main processing
 * Explanation       : Main process of conversion processing
 *                   :
 *                   :
 * Argument (input)   : None
 * Argument (output)  : None
 * Argument (I/O)     : None
 * Return value       : None
 * Created by        :
 * Updated on (created on) :
 * Remarks           :
 *****/

```

```

int main(int argc, char* argv[])

```

```

{
    int nRet;
    bool bRet;

    string tmpStr;
    string tmpFileName;

    // Initialization
    CommFun = new TCommFun();
    CalculateProc = new TCalculateProc();

    if( argc >= 2 ){
        tmpFileName = string( argv[1] );
        bRet = CalculateProc->Init( tmpFileName ); // Reads environmental data from file.
    }else{
        bRet = CalculateProc->Init(); // Reads environmental data from file.
    }
    if( bRet == false ){
        cout << "Stopped with error." << endl;
        exit(-1);
    }

    // Conversion processing initiation
    cout << "Convert start!" << endl;
    nRet = CalculateProc->CalculateProcess(); // Initiates conversion processing.
    if( nRet == NG ){
        cout << "Stopped with error." << endl;
        exit(-1);
    }
}

```



```
cout << "Convert finished!" << endl;
// Post-processing
delete CommFun;
delete CalculateProc;

exit(0);
return(0);
}
//-----
#endif
```